

THE IRON AGE

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New Steel Works Heat-Treating Plant

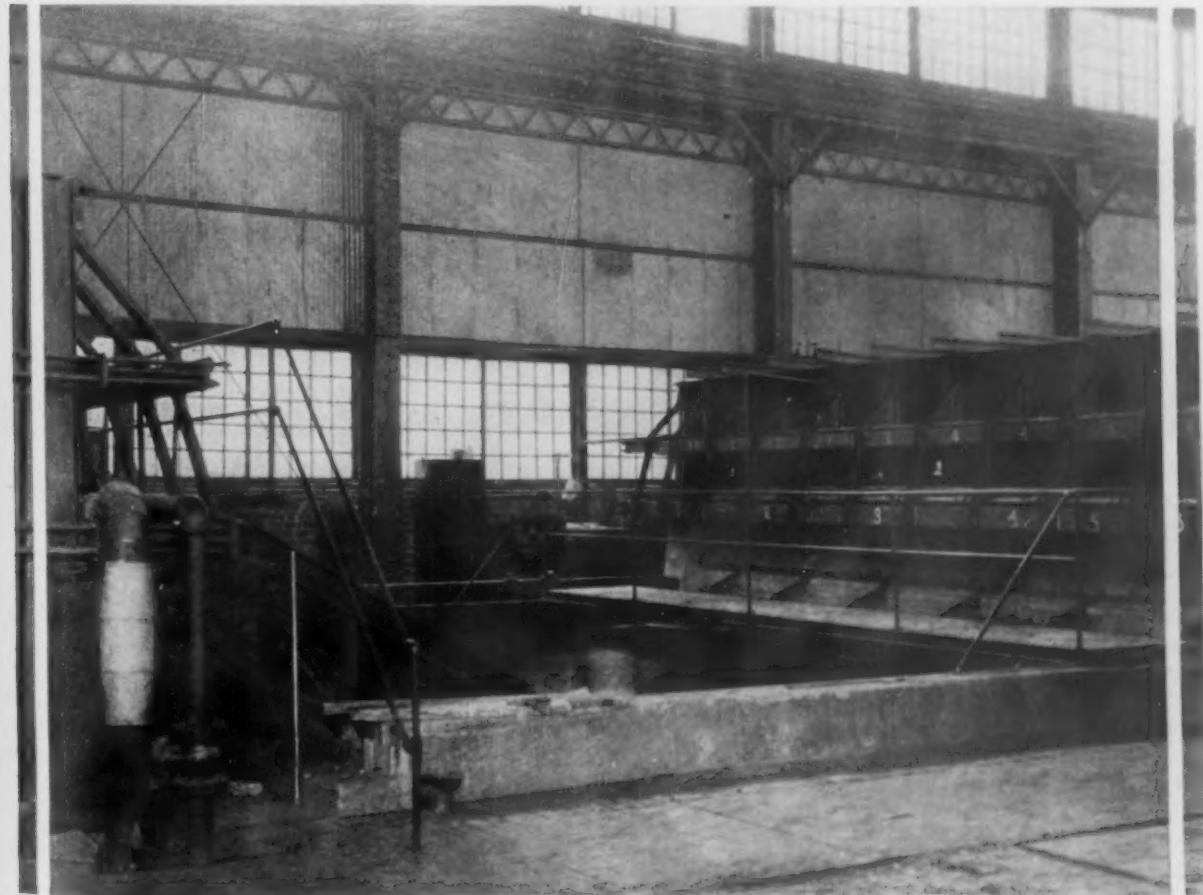
Continuous Automatic Furnace for Long Round Bars in the Works of the United Alloy Steel Corporation, Canton

A PLANT designed for heat treating mill products of carbon and various alloy steels made by both the electric and open-hearth processes, for annealing bar stock and coils and for annealing and heat treating heavy forgings has recently been placed in operation by the United Alloy Steel Corporation, Canton, Ohio. A very important feature of this plant is a new type of automatic continuous furnace for heat treating long round steel bars in quantities.

The heat treating department occupies a modern mill type of building, 480 ft. long and 90 ft. wide, and conveniently arranged for handling material. It is served its entire length by a 10-ton Morgan electric traveling crane with a crane runway 25 ft. above the floor, and a duplicate crane will be installed shortly. All the handling work will be

done by these two cranes. Steel is brought to the plant on industrial cars on narrow-gage tracks that traverse each end of the building. Extending half way through the plant on one side is a standard-gage track, on which steel is brought on railroad cars, and after being heat treated is reshipped in carload lots to the consumers. Stock that is to be cold drawn after annealing is taken in the small cars to the cold drawing department, where it is straightened, cut to length, rough turned, cold drawn, or turned and polished.

The automatic heat treating unit consists of two coke oven or natural gas fired furnaces, one for heating before quenching, a second for drawing after quenching, and a quenching tank, which is located between the two furnaces. These furnaces are used for heat treating round steel bars from



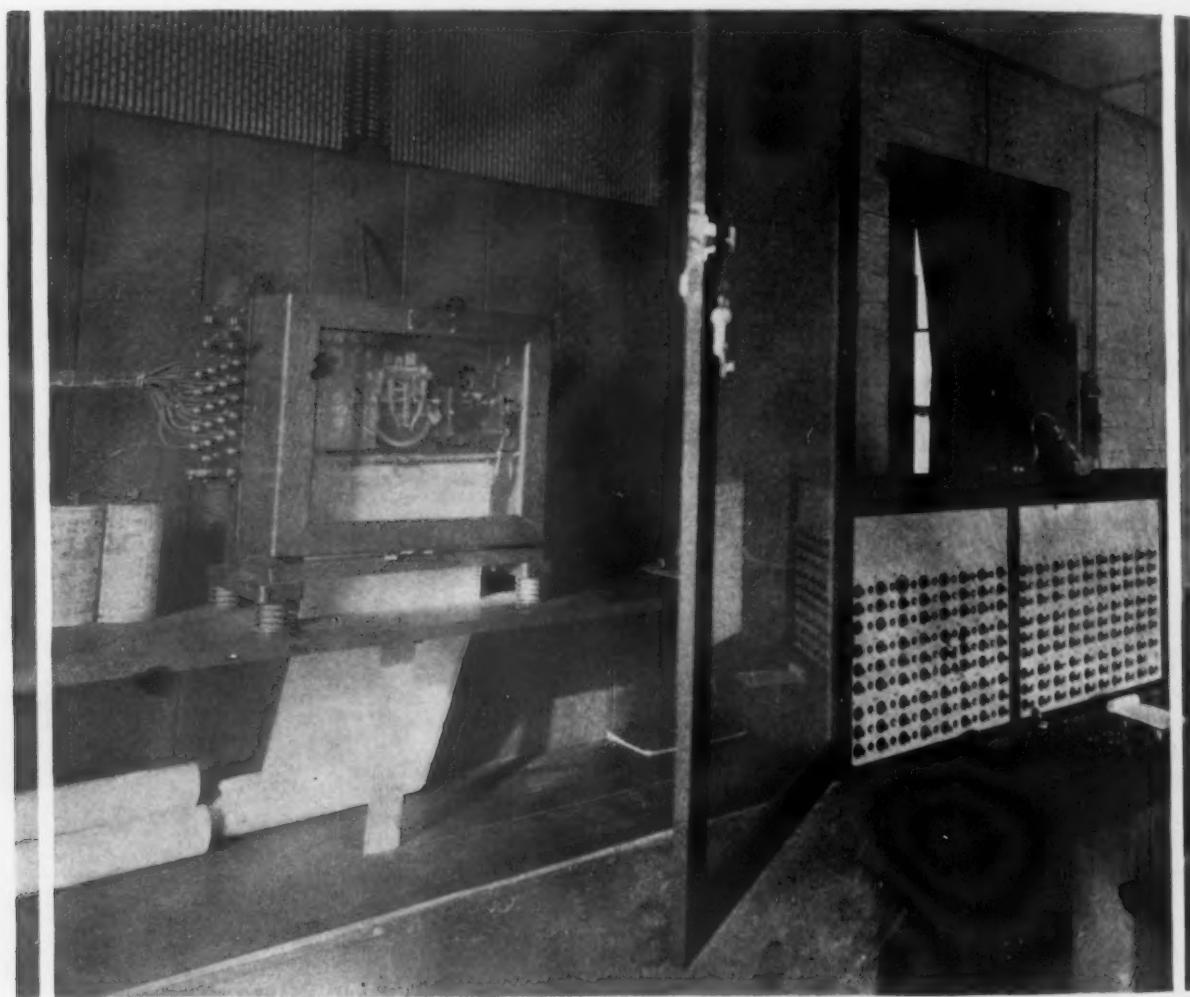
New Type of Continuous Automatic Furnaces for Heat Treating in Large Quantities Bars up to 25 Ft. in Length Which Are Mechanically Conveyed through the Furnaces Sidewise. The bars are discharged from the chamber of the heating furnaces at the right into the quenching tank between the two furnaces, and are then mechanically conveyed up the incline at the left and through the drawing furnace

1 to $2\frac{1}{2}$ in. in diameter and in lengths up to 25 ft. The steel bars are mechanically conveyed through the furnaces sidewise by motor-driven conveyors, the width of the furnace chambers being sufficient to accommodate a bar 25 ft. long. The temperature of the automatic furnaces is taken by a row of thermocouples inserted in the discharge end of each furnace. These couples are connected to both indicating and recording potentiometers. These instruments are located adjoining the furnaces, the control of the furnaces being independent of the control system used in connection with the other furnaces. Both Brinell and tensile strength tests of the bars are taken at such intervals as will assure uniformity of results.

For general heat treating on all sizes of round bars, four standard under-fired furnaces are pro-

capped and sealed with fireclay and taken to the furnaces. This method of annealing is used only on special steels where very slow heating and cooling is required, and to prevent the decarbonization of the surface.

For annealing coil sizes the coils are packed in pots 42 in. in diameter inside, with 18-in. chimneys. About 1000 lb. of coil steel can be packed in one pot. This method of annealing is used for the same grades of steel as the pipe annealing. The pots have lugs on each side for handling and are charged into the furnaces with a long-handled carrier having two roller bearing wheels. The material is first given a normalizing treatment from 14 to 20 hr., depending on its size, composition, etc., and then an annealing treatment at a lower temperature, usually at about the critical temperature of



Central Control Station for the Furnaces. The control board is at the right, and at the left are shown the busbar board and recording instrument permitting the taking of a continuous record of any 10 thermocouples.

vided, arranged in two rows, with an oil quenching tank at one end of two furnaces and a water quenching tank at the end of the other two. These furnaces have hearths 25 ft. in length and 46 in. wide and may be charged or discharged from either end.

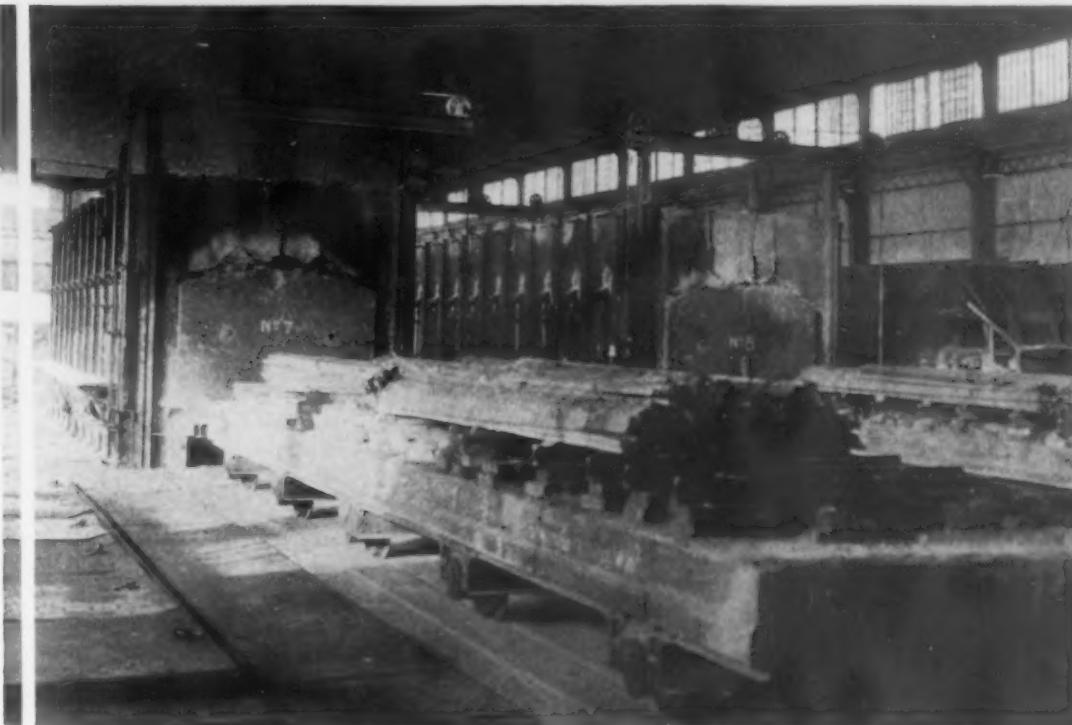
For annealing there are two stationary floor level furnaces and two car type furnaces. The former have hearths 10 ft. wide and 20 ft. in length and are used for pipe and pot annealing of high-carbon steels and various high-carbon alloys, both in electric and open-hearth steels. Straight bars up to 20 ft. in length are placed in pipe 6 and 8 in. in diameter. One end of the pipe is placed in a pit 12 ft. deep, 8 ft. long and 6 ft. wide, adjoining a platform, and is filled with bars and packed with charcoal from this platform. Then the pipes are

the steel. The latter operation requires very thorough heating, followed by a very slow cooling to get the material in the softest possible condition. Tests are taken of the material given this treatment, and it is also subjected to microscopic examinations.

The car type of furnaces is used for general annealing of alloy steel bars, heavy forgings, coils, etc., and also for heat treating heavy forgings. Bar stock is annealed to refine the grain, remove strains, and to give the steel good machining, shearing and cold drawing qualities. These furnaces have a capacity of 25 tons to a charge. Two cars are provided, and while the one charge is being annealed the other car is being loaded. The cars are moved by a drum and cable arrangement, and when one car of material is drawn out of the fur-



View of the Pipe Annealing Section. A pit is provided in which the pipe is placed, leaning against the platform from which the pipes are filled with bars to be annealed. Annealing pots used for coils are shown in the background



The Car Type of Furnaces for Annealing and Heat Treating. Each furnace is provided with two cars operated by a drum and cable, and while the charge on one car is in the furnace, the other car is being unloaded and reloaded

nace the other is drawn in. These furnaces are approximately 35 ft. long and 6½ ft. wide. The cars are 29 ft. long and have five sets of wheels, all running on Hyatt roller bearings. Located near the furnaces is an oil quenching tank 30 ft. long, 6 ft. wide and 6 ft. deep, used principally for quenching heavy forgings.

The blast for the furnaces is supplied by two No. 10 Sturtevant fans arranged in duplicate, so that either may operate the entire plant. Each unit is driven by a 60-hp. motor. Air is supplied at 10 oz. pressure, and gas at 12 oz. pressure. All air blast, gas and water lines and pyrometer leads and electrical wires are carried through the plant in a concrete and brick conduit covered with cast-iron plates. The main gas lines are equipped with quick closing valves, which automatically close if the power goes off the blowers. These valves, together with check valves on the air lines, are safety devices installed to prevent explosions.

The temperatures of all furnaces are taken and observations are made at a control board in the department office, the board operator flashing signals to the furnace operator by red, white and green lights. The furnaces are equipped with base metal thermocouples with nichrome protecting tubes. The control station is provided with a bus-bar board, so that connections can be made to take a continuous record on a 10-point recording instrument of any 10 thermocouples in the plant. The pyrometers, recording instrument and busbar board were supplied by the Leeds & Northrup Co.

Coal Deterioration from Storage

Bulletins discussing the effects of storage on the properties of coal, No. 97, by S. W. Parr, professor of applied chemistry, University of Illinois, Urbana, Ill., issued by the Engineering Experiment Station of that school, and No. 136, by Horace C. Porter and F. K. Ovitz, Bureau of Mines, Washington, have been issued. The former deals with bituminous coal of the Illinois type and the latter covers tests made on New River, W. Va., and Pocahontas semi-bituminous coal, Pittsburgh gas coal and Sheridan, Wyo., sub-bituminous coal.

Results from experiments at the University of Illinois, begun in 1910 and recently completed, indicate that coal in storage increases in weight due to the absorption of oxygen, and Professor Parr ascribes indicated heat losses per pound of fuel largely to this. Porter and Ovitz, using Pittsburgh gas coal, found little, if any, change in weight over a five-year period of outdoor exposure, but explain that laboratory experiments have shown such increases in weight and that net heat losses may be slightly less than indicated on this account. Conclusions of both investigations are that actual heat losses due to deterioration of the coal are small, the maximum loss as determined by the Bureau of Mines being 5.5 per cent in three years for Wyoming coal, while for the other coals losses did not exceed 2.1 per cent in two years.

Storage in open bins was found by the University of Illinois to effect consistently lower percentage losses of heat value than storage under cover, and the Bureau of Mines concludes that, in the storage of Sheridan coal for more than three months, the use of covering bins is not as advantageous as that of air-tight bottoms and sides and the accumulation of fine slack on the surface. Professor Parr recommends that in dry storage all fine material be screened out and that only the lump coal, preferably sized, be stored. An increase in fines or slack was found in both investigations to result from storage, the Bureau of Mines finding this more prevalent in open than in closed bins.

The Asbestos Protected Metal Co., Pittsburgh, announces that it will be represented in Georgia by J. F. Schofield's Sons Co., located at Macon.

Accident Hazards of Forming and Forging Machines

In an address delivered at the recent convention of the National Safety Council, New York, J. P. Bender, welfare director Ralston Steel Car Co., Columbus, Ohio, said that the accident hazards in connection with press forming work were relatively few and relatively serious when compared with those of other lines. To guard against the sudden descent of the platen which would catch the workman unawares he recommended the installation of a check valve in the pressure line which feeds the columns. This valve is open to a flow of water toward the press, but closes against any back pressure which might result from lack of power at the accumulators, or an accident to the pressure lines between the power house and the press. It insures the permanence of the water column under the column pistons and can only be released by a lever in the hands of the press operator.

Bulldozers, unlike hydraulic presses, he stated, present a wider range of accident hazards because of the large number of gears, pinions and shafts required to obtain the necessary power. At first all that was considered necessary in the way of guarding these parts was to furnish individual safety appliances for each separate gear train, but later developments have demonstrated the superiority of a single-unit guard built of angle iron and wire mesh and bolted together in sections, each of which can be easily removed for repair purposes. All the moving parts are readily visible and the time taken to remove the guard and reapply it is practically negligible. Another source of danger mentioned in connection with this machine is that of the operator being caught by stepping between the overhang of the base plate as it comes forward and the stationary head of the machine. To guard against such a possibility at the Ralston plant the base plates were notched out at both ends flush with the outside edge of the housing and back far enough from the front edge to permit the passing of a man's leg without pinching.

In connection with forging machine accidents Mr. Bender pointed out that there is one feature which had caused a number of serious accidents. This was the attempt of the operator to make die adjustments without blocking the pedal. If the clutch became accidentally thrown in, the portion of the hand between the dies was almost invariably lost. He recommended that the guards around the forging machine flywheels be made so that they will permit ready access to the wheel since the only way to back the machine off in case the dies stick is to turn the wheel over by hand, and it is sometimes of great importance that this should be done very quickly.

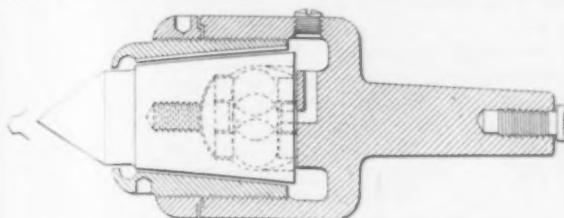
The annual convention of salesmen of the Blaw-Knox Co., Pittsburgh, builder of steel forms for concrete construction, structural steel work and transmission towers, was recently held in its general offices at Hoboken, Pa. One day was given to the inspection of the Blaw plant at Hoboken, Pa., and on the following day a special train conveyed the officials and salesmen to the Knox plant at Wheatland, Pa., complete inspection of both plants being made. The next morning a conference was held at Hoboken, and the convention closed with a banquet at the Concordia Club, 110 men all connected with the sales department, attending.

Superintendents, foremen and assistant foremen of the Harlan plant of the Bethlehem Steel Co., Wilmington, Del., recently gave a farewell dinner at the Hotel Stoeckle, that city, in honor of Walter F. Alexander, superintendent of engineers; William T. Budd, auditor, and J. H. Ferris, chief storekeeper, who severed their connection with the company.

The Champion Engineering Co., Kenton, Ohio, manufacturer of cranes, is now represented in the Chicago territory by Hawkins & Co., with offices at 79 West Monroe Street.

Ball Bearing Center for Shell Lathes

For high-speed engine lathe production work J. A. Moller, New Rochelle, N. Y., has designed a ball-bearing lathe center. It is explained that with this



A Ball Bearing Stem Which Is Free to Revolve in the Middle of a Dead Lathe Center Is Claimed to Reduce the Cost of Shell Production

center a large amount of friction between the revolving work and the dead tailstock center is done away with, which eliminates the generation of heat that tends to draw the temper from the center.

In the new center there is a revolving stem which turns with the work. This arrangement is intended to provide radial support for the work, and this is supplemented by the use of a centrally located floating ball bearing, which is relied upon to distribute the radial stresses on the stem. The bearing or cap for the stem has oil channels and a drip retainer, the lubricant being provided by an oiling device from a large oil chamber. The stem can be adjusted in the housing and has a locking ring for maintaining any desired position. The shank is made in one piece, with the housing, and has an extension rod for the knockout.

Leather Belt Specifications

A general form of belt specifications recently published in *Safe Practices*, a publication of the National Safety Council, Chicago, contains the following items:

Belting must be cut longitudinally and no piece of hide must exceed 54 in. in length. Widths less than 7 in. are to be cut within 15 in. of the center of the hide; widths 7 in. and over are to be cut from the center of the hide; neither shoulder, belly, side nor flank stock, nor any padding nor shimming will be permitted. It must be uniform in thickness and width, and be perfectly straight from end to end.

Laps must not be less than 4 in. or more than 8 in., excepting that in single belting 8 in. and over in width, the lap may be 1 in. longer than the width of the belting; no lap should be within 4 in. of the end of a strip. Laps must be thoroughly cemented, and when pulled apart the exposed surface must not show any resinous, vitreous, oily or watery condition; no rivets will be permitted.

Belting must have an ultimate tensile strength, both in the leather and in the splice, of not less than 3600 lb. per sq. in., and must not show an elongation in 2 in. to exceed 12½ per cent when measured under a load of 2250 lb. per sq. in. for one hour.

Belting must not crack open on the grain side when doubled strongly by hand with the grain side on the outside, nor must it show piping or raising on the grain side when similarly treated with the grain side on the inside.

Belting not waterproofed must come within the following range of weights, which must be guaranteed to be not more than 10 per cent in excess of the actual weight of the leather:

Minimum Weight per Sq. Ft.

Width	Single Belting	Double Belting
1 to 2 in.	13 oz.	24 oz.
2½ to 4 in.	14 oz.	26 oz.
4½ to 5½ in.	15 oz.	28 oz.
6 in. and over	16 oz.	28 oz.

At the recent annual meeting of the California Metal Trades Association in San Francisco the following officers were elected: O. H. Fischer, Union Gas Engine Co., Oakland, president; A. S. Gunn, the Union Iron Works, first vice-president; Frank B. Drake, the Hall-Scott Motor Car Co., Berkeley, second vice-president; Fred C. Metcalf, secretary. James A. Emery, Washington, D. C., member of the National Metal Trades Association, addressed the meeting on "The Relation of War and Industry."

New Vertical Disk Grinding Machine

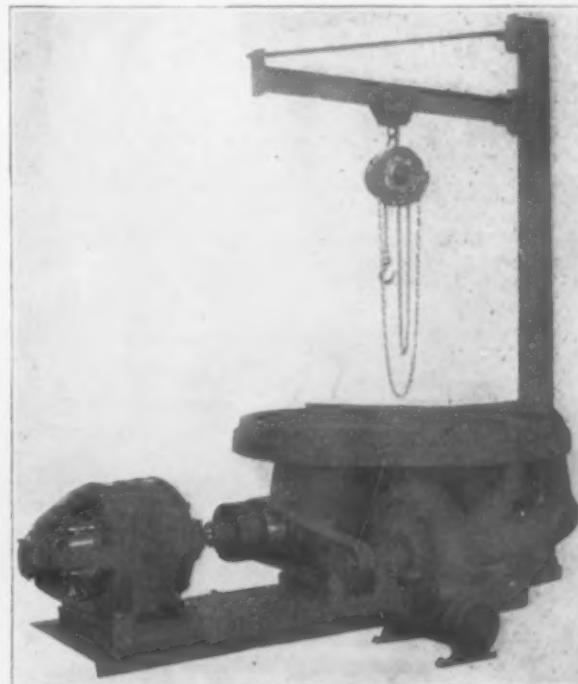
A number of interesting features are embodied in a new vertical spindle disk grinding machine that has been brought out by the Gardner Machine Co., Beloit, Wis. The one which is most apparent is the hoisting attachment for handling heavy pieces of the work, although others are the dust exhaust system and the means for the adaptation of the machine for direct-connected motor drive.

The machine is equipped with a disk wheel 53 in. in diameter and is designed for heavy grinding work. This wheel is supported by a cast-iron flange 20 in. in diameter and 1½ in. thick located on the upper end of a vertical spindle 3½ in. in diameter. This spindle which is driven by a pair of hardened steel bevel gears having a ratio of 2.4 to 1 at a speed of 500 R.P.M. is mounted in two self-aligning radial ball bearings and a thrust bearing, the balls of which measure 1½ in. in diameter, is provided to take care of the end thrust. Ball bearings are used throughout the machine.

The hoisting attachment for handling heavy work pressure weights when the lighter work is being ground consists of a ¼-ton hand-operated chain hoist mounted on a trolley and swinging jib. The jib is attached to a crane column that in turn is rigidly fastened to the base of the machine.

The dust exhaust system includes a fan driven by a belt running over an extra pulley on the driving shaft of the machine and connected to an exhaust manifold. This in turn connects with four openings in the bottom of a dust channel which is cast into the base of the machine just below and around the edge of the disk wheel. A detachable guard ring which permits the occasional removal of any coarse particles is located above the channel and extends slightly over the edge of the wheel.

The machine can be furnished for either belt or direct-connected motor drive. With the latter the armature shaft of the motor is connected to the driving shaft



A Hand-Operated 1/4-Ton Chain Hoist with a Trolley and Swinging Jib Facilitates the Lifting of Heavy Parts from the Floor to the Wheel of a New Vertical Spindle Disk Grinding Machine

of the machine through a flexible coupling, an arrangement which eliminates the necessity of mounting the motor on a side bracket and the employment of a chain and sprocket drive.

A service flag with one large star and the numerals 338 is displayed by the Republic Iron & Steel Co., Youngstown, Ohio, indicating the number of men employed by this concern in its Youngstown district mills that have gone to war.

SUPPLIES OF FERROMANGANESE

Record Domestic Output in October—Available Quantity Increasing

THE domestic manufacture of standard ferromanganese has made pronounced strides in the last few months. The output in October, according to the blast furnace reports of THE IRON AGE, was 26,591 gross tons, the largest ever recorded. The increase had been steady and progressive since the war started until July, this year, when there was a decided spurt. While the average for the first half of this year was 19,892 tons per month, the average for July, August, September and October has been 24,749 tons per month. This is three times the monthly average of 8280 tons per month in the five-year period 1910-1914. The following table gives details of the progress in this important product.

The Domestic Output, Imports and Exports of Ferromanganese—Gross Tons

	Output*	Imports	Exports	Available Supply
January, 1917	21,130	6,211	...	27,341
February	19,942	6,379	...	26,321
March	18,529	5,324	...	23,853
April	17,989	6,846	...	24,835
May	20,722	2,019	...	22,739
June	21,041	3,817	...	24,858
Six-month average	19,892	5,099	...	24,991
July	23,949	2,037	621	25,357
August	24,482	2,840	453	26,869
September	23,973	3,402	57	27,318
October	26,591	2,000	4500	28,091
Four-month average	24,749	2,056	...	26,909
Monthly average, 1916	18,461	7,577	...	...
Monthly average, 1915	12,921	4,605	...	...
Monthly average, 1913	9,958	10,672	...	...
Monthly average, 1912	10,448	8,261	...	...
Five-year average, 1910 to 1914	8,280	8,399	...	...

*As taken from the blast-furnace reports of THE IRON AGE.
†Estimated.

This shows that the average for the last four months, 24,749 tons per month, was three times the output of 8280 tons per month for the five-year period of 1910-1914. It is interesting to note also how the imports have declined. In the last four months the average has been only 2056 tons per month or over 50 per cent less than that for the first six months when they were 5099 tons per month. While exports have not been large recently, they are significant, as showing the shifting of the dependence of foreign countries, particularly Italy, from England to the United States for supplies of the alloy.

An important fact regarding the October output is that more ferromanganese was made in electric furnaces than in any other month.

The 1917 output of ferromanganese will be about 268,000 tons, if the November and December production equals the average for the last four months. This contrasts with 221,532 tons in 1916. The output to Nov. 1 has been 218,348 tons or nearly equal to the 1916 production. Imports in 1917 will not exceed 45,000 tons at the present rate of decline.

Manganese ore imports, on which our whole ferromanganese industry depends, have been very large this year as shown by the following table:

Manganese Ore Imports into the United States in 1917—Gross Tons			
January	49,530	June	62,778
February	39,796	July	53,437
March	56,394	August	87,650
April	27,023	September	36,755
May	81,269	Total	494,633

This is at the rate of 54,959 tons per month as compared with 48,027 tons per month in 1916. If this rate is kept up for the rest of the year, the 1917 imports will be 669,510 tons or more than has ever been imported into any country in one year. In 1913 these imports were 345,090 tons, the record to that time, so that the present year may double that record.

Consumption and Supplies

Late in July the Alloy Committee of the Council of National Defense stated that the consumption needs of

ferromanganese in the United States were about 28,000 tons per month. This estimate has not been greatly altered since. In the first table of this article, it will be seen that the available supply for consumption in October was estimated at 28,091 tons, after deducting probable exports, with the average for the four months ended Oct. 31 at about 27,000 tons per month. It will thus be evident that our needs have been gradually practically met.

Assuming the steel output for 1917 at the present rate to be 44,000,000 tons and that 74 per cent of this is open-hearth steel, as in 1916, with two-fifths of the Bessemer steel output absorbing spiegeleisen as high carbon steel, the following calculation gives the estimated amount of ferromanganese necessary this year, at 17 lb. per ton of steel produced:

44,000,000 X 74	= 32,560,000 open-hearth steel.
44,000,000 — 32,190,000	= 11,440,000 Bessemer steel.
11,440,000 X 2/5	= 4,576,000 high carbon Bessemer steel.
11,440,000 — 4,524,000	= 6,864,000 low carbon Bessemer steel.
32,560,000 + 6,864,000	= 39,424,000 steel required ferromanganese.
39,424,000 X 17 — 670,208,000 lb.	= 299,190 ferromanganese necessary in 1917.

Add to the 299,190 tons the 10,000 estimated as needed in the iron foundry business and we have a total of 309,190 tons necessary for our needs. To meet this total we have the probable production of 268,000 tons this year with imports aggregating 45,000 tons making the total in sight 313,000 tons or apparently sufficient to meet the theoretical needs. The Alloy Committee's estimate however calls for 336,000 tons at 28,000 tons per month.

The Spiegeleisen Output

A summary of the subject would not be complete without reference to the spiegeleisen output of the country. The October output, according to THE IRON AGE, was 22,947 gross tons or the largest for any month this year, bringing the total to Nov. 1, to 177,607 tons or 17,760 tons per month. At this rate the year's total will be 213,127 tons or the largest on record. The 1916 output was 194,002 tons, showing that corresponding strides in output have not been made in spiegeleisen as in ferromanganese.

Aliens May Recover

The Industrial Commission of Wisconsin has issued an official statement to the effect that all aliens residing in Wisconsin, although they may be alien enemies, may recover compensation under the Wisconsin workmen's compensation act if they sustain injuries in the course of their employment in this state. The commission made an investigation of the status of aliens upon learning that an insurance company writing compensation protection in Wisconsin had instructed its agents not to make payments to aliens who are subjects of Germany or its allies. The war industries board, Washington, in an opinion given the Wisconsin commission, states that citizens and subjects of Germany, Austria-Hungary, Turkey and Bulgaria resident within the United States are not enemies or allies of enemies merely by reason of their nationality. Such aliens may become enemies through trading with the enemy or otherwise engaging in hostile acts, but until then or they are proclaimed by the President to be enemies or allies of the enemy, they are entitled to recover compensation in the same manner as heretofore.

The American Zinc Products Co., Youngstown, Ohio, recently incorporated with a capital stock of \$1,000,000, has completed its organization by the election of the following officers: B. W. Kerr, president and treasurer; F. W. Stillwagon, vice-president; H. S. Buck, vice-president and general manager; R. A. Leitch, secretary. The directors, in addition to the officers, are Edward Langenbach, Wade A. Taylor, G. P. Gilmer, W. Manning Kerr, and G. W. Finney. The company recently acquired a plant in Greencastle, Ind.

SUNK BY SUBMARINES

Interesting Facts Developed by Senator Hitchcock's Query

WASHINGTON, Dec. 4.—Nine hundred British vessels aggregating more than 3,000,000 tons dead weight have been sunk by German submarines and mines during the past ten months, according to the first authoritative statement on this subject embodied in a letter from Chairman Hurley of the United States Shipping Board to Senator Hitchcock of Nebraska, written in reply to a series of interrogatories propounded by the Nebraska Senator. These losses, Mr. Hurley states, exceed the tonnage constructed by any nation during the period of a full year.

The greatest shipbuilding feat any nation ever accomplished was that of England in 1913, when 688 vessels of 2,989,229 tons were completed. The American program now on foot, however, will far surpass Great Britain's remarkable performance and will produce 6,000,000 tons by the end of the calendar year, 1918. Of this amount, about 5,000,000 tons will be completed in 1918 alone, thus surpassing Great Britain's best effort by about 1,000,000 tons.

The United States now has available for transatlantic service 582 ships of a total of 3,729,806 tons, including a number of former German and Austrian cargo vessels and oil tankers. The shipping board is now operating 105 German and Austrian ships having an aggregate of 688,960 tons. American private citizens hold 11 more of these ships totaling 63,915 tons and making the aggregate American holding of enemy vessels 752,875 tons.

As illustrating the rapidity with which the construction of cargo vessels in the United States has increased, Mr. Hurley presents some figures not heretofore published, the Bureau of Navigation of the Department of Commerce having abandoned last February its former practice of giving out monthly statements of ship construction. It appears from Mr. Hurley's figures that in the five months from Jan. 1 to June 1 of the present year there were built and launched 87 ships with a total of 503,922 tons, of which 55 vessels of 430,994 tons were of steel while 32 vessels aggregating 72,928 tons were of wood. The construction of the first five months of the current year therefore, substantially exceeded the average annual production of the past ten years. It is interesting to note that during the five months referred to, contracts were placed by private parties for 394 new ships of an aggregate of 2,784,367 tons. These vessels have since been commandeered and are now being completed for the account of the shipping board.

Electric japanning ovens are being installed in a number of Northern Ohio plants. These installations include the following: Fostoria Pressed Steel Co., Fostoria, 200-kw. oven; Holmes Auto Co., Canton, 200-kw. oven; International Harvester Co., Akron, 400-kw. oven for Government truck work; Hunt & Dorman Mfg. Co., Cleveland, two 36-kw. ovens; American Multigraph Co., Cleveland, two 63-kw. ovens. The motors for conveyors, heating units and control panels are being supplied by the General Electric Co., and the ovens for the Fostoria Pressed Steel Co., Holmes Auto Co. and American Multigraph Co. are being furnished by Young Bros., Detroit.

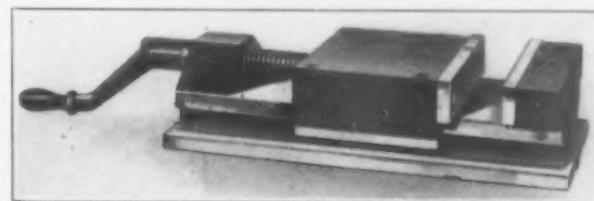
As the result of the acute shortage of coal throughout the country, the Merchants and Manufacturers' Association of Milwaukee has put under way an investigation of the plentiful peat deposits known to exist in Wisconsin and the question of the manner in which these deposits may be utilized as a commercial fuel.

The Biggs-Watterson Co., has removed from 722 Guardian Building to 1235-1237 West Ninth Street, Cleveland.

Plain Vise for Milling Machines

A plain vise designed particularly for use in connection with milling machines has been brought out by the Cleveland Milling Machine Co., Cleveland. The prime object in the design of this vise was to provide a tool that is particularly rigid in its construction and one that is very compact so that the work can be held close to the table, being made as low as possible without sacrificing strength. A machine finished flange is provided on the four edges, allowing the vise to be clamped in any position. It is pointed out that milling machine vises are often used in place of a jig or fixture and become an efficient addition to the milling machine, especially when used in pairs, one vise being loaded or unloaded while the cutters are working on the piece or pieces to be milled in the other vise, and that the vise is adapted for this service by having the tongue slot on every vise an exact distance from the face of the solid jaw.

The jaws are of steel, 6 in. wide and 1½ in. deep and open 4½ in., and can be readily removed for occasionally increasing the range or inserting special jaws. The ways are solid, giving the base greater strength and the construction of the block and gibs is such that they wipe the ways free of chips and foreign material. The movable jaw is of ample thickness to allow for as large a diameter of screw as is consistent with the height of the vise. The tongue slots are milled at right angles to each other so that the vise can be held parallel to, or at right angles with, the spindle. The



Making the Distance Between the Tongue Slot and the Face of the Solid Jaw Exactly the Same in Each One of a New Plain Vise for Milling Machines Tends to Facilitate the Production of Duplicate Work

screw bearing and solid jaws are cored to provide a more even distribution of metal, eliminate shrinkage and make a stronger construction, it being claimed that breakages most frequently occur in these two parts of the vise. The base of the vise is in one piece. The movable jaw is gibbed around the outside. This design eliminates the necessity of having slots cut in the base for clamping the gibs directly underneath. These gibs, however, do not interfere with the clamping of the vise to the milling machine table.

The regular equipment furnished with the vise includes a pair of clamps and bolts and hardened and ground tongues. The vise weighs 50 lb.

Prices on Iron and Steel Products with Differentials and Extras

The prices on iron and steel products with differentials and extras, as agreed upon by Government officials and committees of the American Iron and Steel Institute in September, October and November, 1917, have been published in a 12-page pamphlet by THE IRON AGE, and a copy will be sent to any subscriber requesting it as long as the supply lasts.

The first group dwellings among the number being erected at East Youngstown, Ohio, for the Youngstown, Sheet & Tube Co., by the Unit Construction Co., of St. Louis, is practically completed. It consists of two apartments. The building is made of concrete and the parts are assembled after being poured in molds. The house has attracted much comment, for it is the first one in that district to be built under such a plan. The constructing company has devoted its efforts primarily to building the various parts before cold weather sets in. Thereafter the assembling will be done on a larger scale.

Trade Regulation by Import Licenses

Iron and Steel and Other Metal Products in Which Government Will Control Commerce—An Export Embargo Also

WASHINGTON, Dec. 4.—Another long step toward the domination of the commerce of the world by the United States was taken in the past week when the President issued his first proclamation requiring licenses for the importation of many important products. The action taken will also greatly facilitate the Federal Government in supervising and restricting the operations of so-called non-essential industries if it becomes necessary to limit their output for the purpose of concentrating manufacturing and transportation facilities to provide greater efficiency in the prosecution of the war.

The President's proclamation is based upon authority granted by the trading with the enemy act, which gives the Executive "power to prescribe such regulations governing imports as the public safety may require." Pursuant to this statute, an import division of the War Trade Board was recently created and at its head was placed Clarence M. Woolley, for many years president of the American Radiator Co. Mr. Woolley represents the Department of Commerce on the board and was appointed by the President upon the nomination of Secretary of Commerce Redfield. Mr. Woolley has been in Washington for the past month conferring with the war trade, war industries and shipping boards, the work of which is closely co-ordinated for the supervision of our foreign and domestic commerce, and the list of articles embraced in the President's proclamation for the importation of which licenses will now be required has been most carefully compiled with a view to strengthening materially the power of the President to exert a compelling influence upon the neutral nations to refrain from giving aid and comfort to Germany and her allies.

The list embraced in the President's proclamation includes the following articles of special interest to the readers of *THE IRON AGE*:

Metals and Ores Requiring Licenses

Antimony, antimony ore, or any chemical extracted therefrom; asbestos, chrome, chrome ore, or any ferroalloy or chemical extracted therefrom, cobalt, cobalt ore or any ferroalloy or chemical extracted therefrom, industrial diamonds, all ferroalloys, iridium, manganese, manganese ore or any ferroalloy or chemical extracted therefrom, mica, molybdenum, molybdenum ore or any ferroalloy or chemical extracted therefrom, naxos emery and naxos emery ore; nickel, nickel ore, matte or any ferroalloy or chemical extracted therefrom, optical glass, platinum, plumbago, pyrites, scheelite, spiegel-eisen, tin in bars, blocks, pigs or grain or granulated, tin ore and tin concentrates or any chemical extracted therefrom, titanium, titanium ore or any ferroalloy or chemical extracted therefrom, tungsten, tungsten ore or any ferroalloy or chemical extracted therefrom, vanadium, vanadium ore or any ferroalloy or chemical extracted therefrom, and wolframite.

The countries from which importations are interdicted except under licenses cover practically the entire world, the purpose of the proclamation being to impose the license restriction upon every source of the products mentioned therein. The license requirement becomes immediately effective and applies to all goods arriving in American ports subsequent to Nov. 28. It is understood, however, that it does not apply to goods now in customs custody which actually arrived in port prior to the date of the President's order.

Not Exclusive But Better Control

The War Trade Board is anxious that the practical effect of the licensing requirement should be understood in order that consumers of the articles enumerated in the President's proclamation should not be unnecessarily alarmed. If it were proposed to exclude the articles embraced in this category the proclamation would spell disaster for many industries and would deal a severe blow to the producers of iron and steel in view of the

fact that manganese, nickel, practically all the ferroalloys, tin, spiegel-eisen, etc., are placed under license requirement.

The primary object of the War Trade Board is neither to exclude nor to restrict the importation of these articles, but to regulate their supply and direct its distribution in such a way as to cause them to contribute to the largest possible extent to the conduct of the war. A secondary but hardly less important aim is to exert pressure upon the countries producing the articles embraced in the proclamation to prevent them from supplying food and war material to the Central Powers. This influence can be exerted through the imposition of restrictions upon a number of important products of no direct interest to the iron and steel industry included in the President's proclamation and not embraced in the list above presented. The Netherlands, for example, produce in the islands of Sumatra and Java large quantities of tobacco, the annual importations of which into the United States aggregate many million dollars. The licensing of this commodity will render the Government of the Netherlands very solicitous to meet the wishes of the United States, and especially to co-operate in the matter of providing shipping facilities, a subject which for several weeks has been under negotiation between the State Department and a special mission representing the Dutch Government.

A third object of the license requirement is the absolute control by the Government of cargo space on vessels entering American ports, whether of established lines or tramp steamers. It is obvious that unless a license can be procured to import a certain commodity it cannot be shipped to the United States and that, if shipped without a license, the carriers may be required to convey it elsewhere, as in the case of excluded emigrants. The proposed measure of regulation, therefore, will enable the War Trade Board to dictate the exact character of merchandise to fill every cubic foot of cargo space available to bring commodities to the United States and thus the shipping of the world may be made tributary to the big governmental machine now being organized for the more efficient prosecution of the war.

Not Aimed at "Non-Essentials"

The effect of the first import proclamation upon so-called non-essential industries of the country cannot yet be measured, and it is significant in this connection that the War Trade Board announces that a supplemental list of controlled articles will soon be issued. Many so-called luxuries are composed largely of imported materials and if such materials should be embraced in the list of those subject to license the future of the industries in question would be fully committed to the tender mercies of the War Trade Board. Notwithstanding the fact that a number of so-called luxuries are embraced in the President's proclamation, it is understood that they have not been included therein with a view to developing the Government's policy for the treatment of non-essential industries, but for other reasons, and that no attempt will be made by the War Trade Board to regulate importations of non-essentials or of raw materials for their production until the Bureau of Manufacturing Resources, about to be established by the Council of National Defense, has had an opportunity to perfect its organization and make such investigations as are necessary to form a basis of future action. The whole program concerning non-essentials will be developed slowly and with great conservatism.

Additions to Export License List

Coincidentally with the promulgation of the President's first import proclamation there was issued by the

War Trade Board a supplemental order adding a number of important articles to the long list of those for the exportation of which licenses are required. The new list includes iron and steel wire rope, cable and strands consisting of six or more wires, stud link chain cable, micrometers and calipers, lathe chucks, antimony, antimony ore, asbestos, mica, mica splittings, strontium ores, titanium, wolframite and iridium, and surgical instruments. The export control policy of the War Trade Board is rapidly being developed to a point where licenses will be required for the exportation of practically every product of the United States.

Embargo on Export Iron and Steel

The statistical bureaus of the Government are following with interest the work of the general operating committee of the Eastern railroads, which, from its headquarters in Pittsburgh, has just imposed an embargo, immediately effective, upon the shipment of all export steel billets, bars, plates, scrap and pig iron except that intended for use abroad by the United States Government. This action is expected to result in the very substantial slowing down of the export movement of iron and steel, but it is believed that the interruption will be but temporary and, further, that as soon as possible arrangements will be made for the exportation of a considerable proportion of these commodities through Southern ports, which will relieve the congestion on the lines of the Eastern carriers and obviate an extended embargo.

W. L. C.

Southern Mills Active

BIRMINGHAM, ALA., Dec. 4.—Steel mill operations are active. Inasmuch as the greater portion of the output of the steel mills is going to the Government or Allies, information is not given out. It is announced that three steel fabricating plants will be set up or evolved from plants in existence for the manufacture of steel shapes for shipbuilding. Birmingham interests being concerned in the Southern Shipbuilding Corporation, the new company that recently received a contract for 16 steel cargo ships of the Whittlesey panel type of 7500 deadweight tons each. The ships will be assembled at Charleston, S. C.

All work on the Fairfield Works development of the Tennessee Coal, Iron & Railroad Co., near here, is being rushed and by middle summer it is expected the larger portion of the new plant will be up. Plans are being worked on for the immediate construction of the shipbuilding plant at Mobile, by the Chicasaw Shipbuilding Corporation, subsidiary of the Tennessee Coal, Iron & Railroad Co., recently announced. Labor is being hired in all directions.

The Massachusetts Institute of Technology, Cambridge, Mass., is to begin at once the erection of the Pratt School of Naval Architecture and Marine Engineering Building. Charles H. Pratt, a Boston lawyer, left the bulk of his estate to the institute for this purpose, stipulating that the trustees should hold the fund until it amounted to \$750,000. The fund now exceeds that amount by \$100,000. The erection of the building has been deferred until this time on account of the high cost of materials and labor, but is now undertaken as a patriotic duty on account of the urgent demand for naval architects and draftsmen.

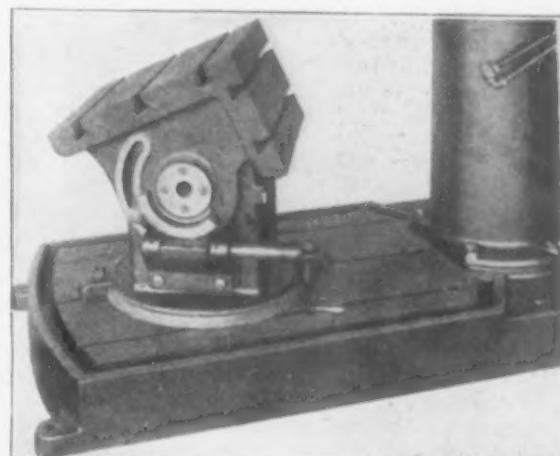
The LaCrosse Tractor Co., LaCrosse, Wis., has appointed F. C. Upton, Minot, N. D., to represent the company, and Gaston, Williams & Wigmore, Inc., New York in connection with recent shipments of several hundred tractors to France. Mr. Upton is on the way to France and will remain there until the spring of 1918.

The plant of the H. A. Matthews Mfg. Co., Seymour, Conn., has been closed by a strike of about 250 hands. A compromise offer of the company has been refused by the strikers.

Radial Drilling Machine Tilting Table

The Morris Machine Tool Co., Cincinnati, has developed a universal tilting table for use on its radial drilling machines as a substitute for the regular box table. A working surface 18 in. square is provided on the top, while the side surface measures 11 x 18 in. The top of the table has three T-slots $\frac{3}{4}$ in. wide and the side has two.

The construction of the table is rigid and a worm and wormwheel segment operated by a crank enable the table to be tilted to any angle. The wormwheel segment is graduated in degrees to facilitate setting and when the table is in its normal position with the top horizontal, it rests on positive stops. In addition



A Worm and Wormwheel Segment, the Latter Graduated in Degrees, Facilitates the Tilting of a Universal Table for Radial Drilling Machines

to being tilted to any angle within the customary range, the table can be swiveled on the base of the machine and clamped in position by bolts in the T-slots of the base.

Meeting of Taylor Society

A war meeting will be held by the Taylor Society in Washington, D. C., Dec. 7 and 8. It will also be its annual meeting. On the afternoon and evening of Dec. 8 in the Washington Club, a conference is scheduled on "The Centralization of Administrative Authority." Among those scheduled to take part are: Major W. P. Barba, gun division, ordnance department and formerly of the Midvale Steel Co.; Walter S. Gifford, director Council of National Defense; J. E. Otterson, chairman sub-committee on small arms and munitions, Council of National Defense and vice-president and general manager Winchester Repeating Arms Co.; Judge Edwin B. Parker, member priority board, Council of National Defense; Henry B. Thayer, president Western Electric Co., and Robert P. Bass, member sub-committee on mediation and conciliation, Council of National Defense.

On Friday evening at the Cosmos Club, two papers are announced. One of these is by Capt. H. K. Hathaway on "Organization Work in the Supply Division of the Ordnance Department."

The Terry Shipbuilding Co., Port Wentworth City, Savannah, Ga., has perfected plans for the construction of a number of dwellings for its employees. The buildings will be erected by the Port Wentworth Terminal Corporation and will be leased to the Terry company at a rental based upon construction cost.

A strike of about 200 workmen at the American & British Mfg. Co., Providence, R. I., for an eight-hour day has been settled by Federal mediators. The basis of settlement has not been announced. The company is engaged on a Government contract for anti-aircraft guns.

The Electric Furnace and Central Station*

Relations Between the User and Producer of Electricity for Steelmaking — Standardized Equipment — Future of the Electric Steel Furnace

BY EDWIN L. CROSBY

PROBABLY no instrument for the use of electrical energy for industrial purposes, other than the induction motor, has caused as much interest among both central-station operators and their patrons as the electric furnace, particularly in its application to the steel industry. Up to the present time approximately 200 steel furnaces of various types, having an annual capacity of about 1,200,000 tons of steel, have been installed or contracted for on this continent. This steel production involves the use of approximately 750,000,000 kw.-hr. per year. Thus is the very healthy interest of the aggressive central station man in the problem justified.

Errors That Have Been Made

Naturally in the attempt to secure all the new business possible by the use of electric furnaces many companies, both in the steel casting trade and central station business, have made serious errors. Many steelmakers and foundrymen have installed furnaces which for various reasons were utterly unsuited to their use. Also many central stations have listened to the luring tales of various highly estimable furnace salesmen and permitted, even urged, the connection of furnaces to their lines, the operation of which was fatal to the happiness and peace of mind of the entire production department of the stations concerned. Beautiful visions of regulation equivalent to that of a lighting load, perfect phase balance, etc., have become nightmares of despair to not a few of the power companies of the country. Others have quoted rates for this class of service inconsistent with the characteristics of the load with rather disastrous results to their balance sheet.

To avoid unnecessary repetition of such occurrences it is essential that a closer study of the adaptability and operating characteristics of electric furnaces in general and the more common types of steel furnaces in particular be made by foundrymen contemplating the installation of such apparatus as well as by the central stations from which the foundrymen are likely to purchase power.

Right of a Foundryman to Advice

Any foundryman has a right to expect intelligent advice from his local central station on the electrical characteristics, their advantages or disadvantages, of any electrical equipment he may contemplate purchasing. Central stations certainly stand ready to advise a storekeeper as to the best form of lighting equipment for him to use or to tell the power consumer which type of motor is best fitted for the particular purpose under consideration.

By the same token, the central station anticipating electric furnace business should be prepared to discuss intelligently with the buyer of an electric furnace the electrical and metallurgical characteristics of the various types offered for sale. The power salesman must have a fairly good understanding of the metallurgical practice involved before he is able to give dependable data on the electrical performance of any furnace, as these two matters are very closely related. For instance, an electric steel furnace connected to a large power system capable of handling large blocks of energy may be operated with less regard to fluctuating power input than if it were connected to a system of which it constituted a large proportion of the total load.

Take a specific case—melting and refining cold scrap

for small steel castings. The only limiting factor in the rate of current input during the melting period seems to be the effect upon the customer's demand. The scrap has an infinite capacity for absorbing heat, the refractories will not be injured, the radiation losses per heat are decreased and the electrical equipment, if properly designed, can stand considerable overload during this period, if it is really desirable to increase the rate of energy input. When refining, however, a much lower rate of heat, hence energy, input may be desired, perhaps only that rate necessary to maintain the temperature already acquired until sufficient time has elapsed for the desired chemical reactions to occur. It would seem, therefore, desirable to operate with a much higher arc voltage during the melting period, decreasing the potential when the bath becomes fluid and refining is begun. It is entirely possible that such a method may result in a lower cost of power per ton. Quite certainly it would result in a lower current consumption per ton and if carefully controlled, an extra heat per day is easily obtained. Balanced against the increased demand charge per ton of metal are lower overhead charges, lower labor charges, lower radiation and electrical losses and general increased operating efficiency.

Here is where it is quite necessary for the central station man to assist the furnace user in determining the most economical point for operation. The method of determining demand and greater current fluctuations upon the distribution system are important factors in the determination of this point, and require a fair degree of familiarity with electric furnace practice as well as with the central station rate schedule.

Standardization of Equipment

In this connection it is the writer's sincere belief that there is considerable opportunity for standardization of demands by the central stations of the country. It does not seem reasonable that local conditions are sufficiently diverse to account for the extremely variant methods now employed by companies selling service under relatively similar conditions.

While the cost of power per ton of steel produced is of course important, being one of the greatest tangible items in the cost sheet, the writer has visited several electric furnace installations where power cost seemed to be the paramount issue, while in reality a lack of superintendence and generally loose organization ran up charges far in excess of any reasonable power cost. As a matter of fact, industry in general is rapidly awakening to the fact that with the present greatly increased cost of labor and material together with a very slight (if any) increased cost for electricity, the power cost of most any article manufactured is not as important as formerly was the case.

Heretofore, the greatest item for consideration among central stations desiring an electric furnace load has been the power factor. There is no occasion for unrest upon this point at the present time, as very careful investigation of several furnaces of various types has shown that with the possible exception of one type of arc furnace, and the certain exception of the induction furnace, all steel furnaces on the market to-day, if properly installed, will operate with a power factor of 0.80 to 0.85 during the early stage of the melting period, later rising to 0.85 to 0.90, and finally to a point as high as 0.95 or better during the refining period.

Inasmuch as single-phase arc furnaces should never be connected to polyphase systems except through phase converters, while induction furnaces operate more satisfactorily at frequencies below those in general use, thus

*From a paper presented at the annual meeting of the American Foundrymen's Association in Boston, Sept. 25 to 28, 1917. The author is with the Detroit Edison Co., Detroit, Mich.

requiring frequency changes, either of these types, thus equipped, may be connected to a polyphase system so as to impose unity or even a leading power factor.

Phase Balance and Wave Distortion

Regulation, phase balance and wave distortion have not, on the other hand, received the attention they undoubtedly deserve. Present electrode regulation is at the best very unsatisfactory, it being impossible with any existing equipment to obtain sensitive regulation without considerable hunting of electrodes and disturbance of phase balance. If it is proposed to connect an electric furnace to a network properly designed to satisfactorily operate under existing conditions and with existing load, very careful consideration should be given to this point of regulation, and it may be advisable that carefully selected reactances be placed in the furnace circuit.

Recent oscillographic investigations have shown a very marked distortion of the current wave in all types of arc furnaces. This subject is a very important one, as it may affect the accuracy of induction type watt-hour meters. Large wave distortion is also detrimental to the operation of other apparatus connected to the system, for instance, lowering the efficiency of rotary converters.

At first thought it may seem that such subjects are irrelevant before a foundrymen's meeting, but the writer wishes to call attention to the fact that it is necessary for a public utility serving any particular class of business to charge back to that class any expense contingent upon the service; so that if in order to superpose upon existing systems, satisfactorily operating any new form of load, it becomes necessary to increase the investment to an abnormal point, that investment must be reflected in the rate charged for the new class of business.

The writer does not wish to pose as an alarmist, nor does he believe that in the large majority of cases any such fears need be serious deterrents, but when a central station operating a transmission system of considerable length with somewhat limited capacity in generating and distributing equipment connected, attempts to take electric furnace business, especially at rates based upon existing conditions, it is quite likely to get into serious difficulty which may later cause the station, as well as the furnace user, deep regret.

Advice as to New Installations

For the reasons mentioned, it is obvious that the representative of a central station anticipating electric furnace business should thoroughly familiarize himself not only with the operating characteristics of various types of electric furnaces, but also with his customers' requirements, and after careful consideration should offer an unprejudiced opinion upon the relative desirability of the various furnaces obtainable. It may be good judgment to advise against the electric furnace installation entirely. This was the writer's experience upon two occasions recently. Two customers having more or less scrap to sell and experiencing the universal difficulties in steel deliveries contemplated the installation of electric furnaces to supply their demands. After considering the investment, delivery on furnace and electrical equipment, the uncertainty of the market both during and after the war, the customer in each case was unhesitatingly advised not to make the installation. Incidentally, I believe any central station who urges the installation of electric furnaces for steel based upon the present market may later have cause for regret, unless he receives a rate commensurate with the risk.

The central station and the steel manufacturer have to consider from different standpoints the conditions peculiar to the present time, in deciding whether the investment in an electric furnace or the investment in the power plant and transmission necessary to supply that electric furnace should or should not be made. The steel manufacturer may be able to recover his entire investment by the sale of his output at high prices in a war time market which cannot get enough high-grade steel, whereas the central station is required by financial methods, and in some cases by law, to

treat all of its investments as permanent, or if not permanent to be amortized over a long period of time, and is further required to have its rates for all classes of service consistent with one another. Therefore, the central station is compelled to consider the future of the steel market, the permanency of the service and the possibility of selling its capacity to some other industry in case the steel furnace should cease to be profitable to the manufacturer after the normal market conditions are restored.

Electric Steel Now and After the War

Perhaps the demand for high-grade alloy steel for new uses after the war will keep all the electric furnaces busy. Perhaps the increased cost of labor and fuel will operate against the open-hearth or other less efficient processes sufficiently to allow the electric furnace to compete in ordinary tonnage production. The central station certainly hopes so. But meanwhile any installation should be carefully considered. Such advice at this time is perhaps superfluous, as it is doubtful whether deliveries on electric furnace equipment are attractive enough to cause any great interest.

As stated in the report of the electric steel furnace committee to the National Electric Light Association this year, that body believes that the electric furnace should supplant or successfully compete with the crucible or converter processes for any purpose. It should, given usual freight differentials, supply local markets with the equivalent of the higher grade open-hearth material, local scrap markets being favorable. However, under normal conditions the committee did not feel that the electric furnace was a competitor in tonnage steel.

In the steel castings trade there appears to be no reason why the electric furnace, when thoroughly developed, should not supplant practically all other methods in foundry use. By close co-operation between foundrymen and the central station people that development can quickly be carried to completion. We may reasonably hope to realize that long anticipated ideal which I once heard stated at a meeting of this society by a representative of a competitor of the electric furnace, namely: "The electric furnace method is the ideal method for making ideal steel." The central station is willing to do its part.

Organization of New Chain Company Completed

The merger of the Columbus and McKinnon Chain companies which was announced in THE IRON AGE, Nov. 1, was recently completed by the election of Charles M. Wambaugh, formerly president of the Columbus Chain Co., as president of the new organization, which will be known as the Columbus-McKinnon Chain Co., with general offices at Columbus, Ohio. George J. Armstrong and Daniel Carroll are the vice-presidents, L. E. McKinnon, former president of the McKinnon Chain Co., is treasurer, and Arthur R. Markel secretary and assistant treasurer. The other directors of the company are S. A. Webb, I. B. Cameron, Cyrus Huling, Howard C. Park, W. A. Nottman and R. A. McKinnon. New office and factory buildings, to cost over \$50,000, are being erected at the Columbus plant. Three plants beside that at Columbus will be operated at Lebanon, Pa., Buffalo and St. Catherines, Ont., Canada, and the total number of employees will be approximately 1500.

New Record for Electric Furnace Lining

The Hess Steel Corporation of Baltimore established a new record in its plant for the life of furnace linings, when its furnace No. 2 lining lasted for 146 heats. This furnace is a Heroult electric of 6-ton capacity, lined with standard silica brick above the slag line. The steels made during the period were chiefly chrome vanadium and chrome nickel steel and some high carbon tool steel.

The General Fireproofing Co., Youngstown, Ohio, recently distributed a bonus of \$19,000 to its 530 employees.

ANALYSIS OF FERROSILICON

Rapid Commercial Method for Determining Value of 50 Per Cent Alloy

FOR some time, at least in the early stages of the use of high-grade ferrosilicon in steelmaking, the analysis of this alloy has been a source of annoyance and difficulty to both buyer and producer and there have been conflicting results on the same samples. In a paper, "A Method for the Commercial Analysis of Ferrosilicon," presented at the thirty-second general meeting of the American Electrochemical Society at Pittsburgh, Oct. 4, 1917, Russell E. Lowe, chemist with the FitzGerald Laboratories, Inc., Niagara Falls, N. Y., gave details of an excellent method which is claimed to meet modern commercial conditions. It is of special interest and value to the steel chemist. An abstract follows:

This analytical procedure is the result of an extended series of experiments to evolve a rapid and accurate method for the analysis of ferrosilicon without the aid of the powerfully oxidizing fluxes at present used. By "commercial analysis" is meant the quantitative determination of sulphur, phosphorus, manganese, iron, aluminum and silicon, since these elements are the ones generally specified in contracts for the 50 per cent alloy.

The older procedures require a flux consisting of 20 grams of sodium carbonate and 4 grams of potassium nitrate to break down a 1-gram sample of the alloy. A fusion of this character is decidedly destructive to platinum, and requires almost constant supervision because of its tendency to creep over the side of the crucible. Another fault is that it is slow. Because of the minute quantities of impurities present, a gram sample must be used. This means the tedious handling of a large volume of silica, and involves a second fusion since it is impossible to wash silica absolutely free from the heavy metals.

The following method of procedure has been tried on several samples of ferrosilicon that were previously analyzed by an outside laboratory of recognized standing, and in practically all cases the agreement was found to be within the limits of experimental error. The method is recommended as being simple, accurate, rapid and saving of platinum.

Determination of Sulphur and Phosphorus

Mix sample thoroughly and powder in a diamond mortar until it passes through a 100-mesh screen. Weigh about 1 g. of the powdered sample into a 100 c.c. platinum dish, add 25 c.c. of concentrated nitric acid, cover with a watch glass and place on a boiling-water bath. When the contents of the dish have reached the temperature of the bath add a few drops of hydrofluoric acid. As soon as the resulting violent reaction has ceased add a second portion of the acid. Continue this procedure until only a slight residue is visible on the bottom of the dish, then add about 5 c.c. more of hydrofluoric acid. Remove the watch glass, carefully washing any matter adhering to it into the platinum dish with a stream of hot water, and evaporate the solution to dryness. Add 10 c.c. of concentrated nitric acid to the contents of the dish and repeat evaporation on water bath. Dissolve residue in dish with 50 c.c. of a 5 per cent solution of nitric acid, heating to hasten the process.

Add to the dish a concentrated solution of sodium carbonate in small portions and with constant stirring until it is present in slight excess, then transfer the contents to a glass beaker and dilute with hot water to about 200 c.c. Heat contents of beaker to boiling and allow to settle. Filter solution through a 12.5 cm. filter, washing the precipitate five times with hot water.

Sulphur.—The filtrate contains the sulphur, and to it is added an aqueous solution of calcium chloride until the precipitation of calcium fluoride and calcium carbonate is complete. Boil the solution for a few minutes, allow the precipitate to settle, filter through a 12.5 cm. filter paper. Wash the precipitate five times with hot water.

Acidify filtrate from the calcium chloride precipitate with hydrochloric acid. Heat the solution to boiling and add 25 c.c. of boiling 6 N barium chloride. Allow solution to stand in a warm place for one hour, then filter through a 9-cm. No. 42 Whatman filter, or its equivalent. Wash filter with hot water until it is free from chlorides.

Ignite this filter in a weighed platinum crucible, cool in dessicator and weigh the sulphur as barium sulphate. Calculate to sulphur. It is advisable to run a blank.

Phosphorus.—The sodium carbonate precipitate contains the phosphorus, as iron phosphate. This precipitate is dissolved from the filter with hot nitric acid, specific gravity 1.13 (about 1 vol. of concentrated nitric acid to 3 of water). Fifty c.c. of the acid will be found ample if it is poured through the filter several times. When the precipitate is completely dissolved the filter is washed, first with a 1 per cent solution of nitric acid, then with hot water until it is free from iron.

The solution is now heated to boiling, with the addition of a few drops of a concentrated solution of potassium permanganate, and kept at this temperature for about five minutes. Add a solution of ferrous sulphate in water, acidified with sulphuric acid, until any precipitate of manganese dioxide dissolves and the solution becomes quite clear.

Remove solution from the source of heat and add 50 c.c. of ammonium molybdate solution. Allow to stand for 30 minutes, filter through a 9-cm. filter paper, then wash first with 1 per cent nitric acid solution, second with hot water until the yellow precipitate is free from iron.

After the method of J. O. Handy (Blair, Chemical Analysis of Iron, 7th ed., p. 104), transfer the filter paper and yellow precipitate to a glass beaker, add a definite volume of sodium hydroxide solution that has been standardized against a steel of known phosphorus content, and titrate for the excess of alkali with a standardized solution of nitric acid. Calculate to phosphorus.

Manganese, Iron and Aluminum

Weigh about one gram of the finely powdered sample into a platinum dish and proceed with the decomposition of the alloy in a manner identical with that given in the sulphur-phosphorus procedure, up to and including the first evaporation to dryness.

Cover residue in the dish with 25 c.c. of a 1:5 solution of sulphuric acid. Evaporate solution almost to dryness. Cool. Add 25 c.c. of distilled water, raise contents of the dish to the boiling point, then transfer to a glass beaker. Add 100 c.c. of water, a few drops of concentrated hydrochloric acid and boil until solution is complete. Determine manganese, iron and aluminum in this solution in the regular manner, as given in Blair's Analysis of Iron and Steel, or any standard work on qualitative analysis.

Determination of Silicon

Silicon is calculated by summing up the percentages of the elements determined and subtracting from 100. For an extremely rapid but approximate determination of silicon, accurate within 0.5 per cent, weigh 0.25 g. of the sample into a weighed platinum dish. Decompose with mixed acids as before. Evaporate solution to dryness. Ignite dish at red heat, cool in dessicator and weigh. Assume residue to be entirely composed of iron oxide. Calculate to iron and subtract this value from the weight of the sample, calling the difference silicon.

Notes on the Analysis

Nitric acid must be added first to prevent the volatilization of iron, sulphur, phosphorus, etc., as fluorides.

By keeping the solution hot it is possible to maintain a much more even rate of decomposition. When hydrofluoric acid is added to a cold solution the reaction is very apt to start with such violence as to eject the contents of the dish.

The treatment with sodium carbonate prior to transferring the solution from platinum to glass is necessary because of the traces of free hydrofluoric acid in-

variably present in the acid solution. For the determination of sulphur and phosphorus it is obviously impossible to make use of a sulphuric acid evaporation to remove the last traces of fluorine. Likewise, the contents of the dish cannot be evaporated to dryness and baked owing not only to the danger of volatilizing phosphorus, but also to the difficulty of getting the ignited oxides back into solution. By the addition of sodium carbonate, the traces of fluorine remaining are converted to the fluoride and this is later removed by precipitation with calcium chloride in the sulphur determination. Before this method was adopted the etching of beakers and cover glasses was quite noticeable, while the presence of gelatinous silica made filtrations most difficult.

It is to be noted that in no case is there an evaporation of a ferric chloride solution in contact with platinum. This eliminates another source of loss of that expensive metal.

Government Steel-Plant Accident Statistics

WASHINGTON, Dec. 4.—The trend of accident frequency rates in the iron and steel industry during the war period has been made the subject of a study by the Bureau of Labor Statistics, which is about to publish a report compiled by Dr. L. W. Chaney, covering more than 50 per cent of the industry. The following table from the bulletin shows the fatality rates and frequency rates of all accidents from 1913 to 1917, the statistics being presented by overlapping years ending with March, June, September and December:

Accident Frequency Rates from 1913 to 1917 Per 1000—
300-Day Workers

Year Ended	No. of Workers	Fatali- ties	Total Accidents
Dec. 1913	153,098	1.34	181.0
Mar. 1914	146,522	1.29	168.4
June, 1914	137,816	1.09	154.7
Sept. 1914	128,023	.81	138.9
Dec. 1914	117,214	.70	130.4
Mar. 1915	111,881	.63	118.0
June, 1915	111,794	.65	114.0
Sept. 1915	117,933	.85	118.6
Dec. 1915	133,627	.86	124.5
Mar. 1916	148,221	.96	131.8
June, 1916	160,819	1.09	134.1
Sept. 1916	168,790	1.02	135.5
Dec. 1916	175,013	1.11	133.2
Mar. 1917	178,937	1.15	128.5
June, 1917	182,587	1.08	121.6

Factors in the results are industrial conditions and accident-prevention effort. Accident rates rise with recovery from depression and fall again with declining industrial activity. Also, each successive rise has not reached the altitude of those preceding.

Zirconium Steel for German Armor Plate

That ferro-zirconium has been successfully employed in Germany for the production of zirconium steel, was brought out by J. A. Audley in a recent address before a meeting of the Refractory Materials Section of the Ceramic Society (British). Such steel is being used for armor plates, projectiles, bullet-proof steel and other special purposes. Zirconium steels are stated to be particularly hard, one inch of such material being equal to three inches of the best German armor plate. Before the war the Germans had practically a monopoly of the supplies of zirconia, which was mainly dealt with under German patents, but this state of affairs has since been modified. It is of interest to note that practically every rare element has proved of industrial importance in steel metallurgy, but it is doubtful if such elements would be of much value without the very common element carbon.

The Republic Rubber Co., Youngstown, Ohio, will triple its capacity in the manufacture of automobile tires. The company has recently issued \$3,000,000 of stock to provide funds for the proposed extensions.

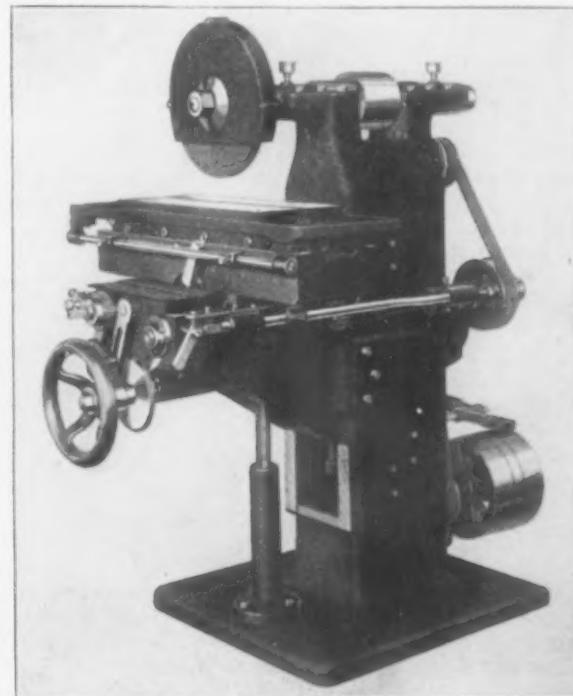
The Electric Appliance Co., 881 Third Street, Milwaukee, Wis., has recently purchased the patents on the Acme pinch dogs and is now supplying these to pattern shops.

Automatic Surface Grinding Machine

The Noble & Westbrook Mfg. Co., Hartford, Conn., has recently brought out the new surface grinding machine. A guard practically covers the entire grinding wheel, and there are automatic stops for the cross slide and the platen may be started and stopped without interfering with the operation of the spindle or other parts of the machine.

The machine will handle work which does not exceed 20 in. in length and 8 in. in width, the maximum distance between the bottom of the grinding wheel and the top of the platen being 7 1/2 in. The table-elevating mechanism is equipped with ball thrust bearings, and it is possible to start or stop the platen at any point within the limits of its travel without stopping the spindle or any other part of the machine.

The wheel, which is 12 in. in diameter with a 1/4 in. face, is mounted on a spindle measuring 1 9/16 in. in diameter. A belt drive is provided for a countershaft equipped with self-lubricating steel hangers. The spindle bearings are 6 in. in length, and are arranged to compensate for wear, as are all of the slides as well.



The Wheel of a New Automatic Surface Grinding Machine Is Almost Entirely Covered by a Guard and Automatic Stops Are Provided for the Cross Slide to Insure Safety

The diameter of the spindle between the flanges of the wheel is 1 1/4 in. The machine can be supplied either with or without a magnetic chuck.

Manganese Ore Prices

Indian manganese ore has sold recently in this country as high as \$1.30 per unit, seaboard, for high-grade material. Brazilian ore has been quoted at \$1.10 to \$1.20 per unit, seaboard. For domestic ores a leading dealer is now offering the following prices: \$1.20 per unit for ore containing 50 per cent or more manganese; \$1.10 per unit for ore averaging 46 to 49.99 per cent; \$1 per unit for 42 to 45.99 per cent ore, and 90c. per unit for 38 to 41.99 per cent ore. For all these grades maximum limits of 10 per cent silica, 0.20 per cent phosphorus, and 3 per cent iron are stipulated.

A Beaumont, Tex., dispatch says that by an almost unanimous popular vote approval has been given for a bond issue of \$300,000 to deepen the waterway to the sea from Beaumont to a depth of 28 ft. Heretofore 26 ft. draft has been the limit. The deepening of the channel is considered important to the Texas Steel Co.'s project for the location of a steel plant at Beaumont.

NEW MERCHANT MARINE

Building Program Will Add 1408 Vessels with Large Tonnage

WASHINGTON, Dec. 4.—The addition to the American merchant marine of no less than 1409 vessels, with a total dead-weight capacity of 8,363,801 gross tons, is embraced in the building program of the United States Shipping Board, according to the first comprehensive official summary just made public here. The significance of these figures will be appreciated when it is remembered that the total tonnage under the American flag when the Shipping Board was organized was slightly less than 8,000,000, so that the increase to be realized within the next 15 months will exceed 100 per cent. In point of actual efficiency the increase will be far greater, as the great bulk of the new tonnage will be standardized cargo-carrying vessels of relatively high speed.

The total tonnage included in the official statement made public by the Shipping Board includes 884 vessels contracted for, with a total dead-weight capacity of 4,724,300 tons; 99 vessels with a total of 610,000 tons, for which contracts will be closed within a few days, and 426 vessels with a total capacity of 3,029,508 tons, which have been requisitioned on the stocks in the various shipyards of the country. Of the vessels requisitioned, 33, with a total of 257,575 tons, have been completed and put into service since the Shipping Board was organized. Of the vessels thus released seven, with a total of 73,760 tons, are ore carriers which were allowed to perform the service for which they were originally designed.

The following table shows the vessels under contract, pending contract and requisitioned by the Emergency Fleet Corporation:

Type of Vessels	Number of Vessels	Total Dead-weight Capacity
Wood	375	1,330,900
Composite	58	207,000
Steel	451	3,186,500
Total contracted for	884	4,724,300
Contracts pending	99	610,000
Total	983	5,334,300
Total requisitioned (all types)	426	3,029,508
	1,409	8,363,808

An important feature of the work of the Emergency Fleet Corporation is the completion and releasing of requisitioned vessels which were building at the time the Shipping Board was organized; in fact, the placing of these ships in service represents the only practical fruits of the board's program to date. As these vessels averaged 50 per cent completed when the board took them over, and as they aggregated more than 3,000,000 tons, it is apparent that their addition to the merchant marine will constitute a factor of great importance. The requisitioned vessels already completed and released number 33, with a dead-weight tonnage of 257,575.

The building program will exhaust about \$1,300,000,000 of the Shipping Board's appropriation of \$2,000,000,000, the outstanding contracts, including those commandeered, having been made on a basis averaging about \$160 per ton. The board therefore has to its credit approximately \$700,000,000, with which, after deducting the cost of equipping the three Government-owned shipyards now being laid out, it is estimated there can be built from 350 to 450 additional vessels aggregating 3,300,000 tons. Contracts for these additional ships will be made as rapidly as possible, but preference will probably be given to contractors who propose to build on the Great Lakes, the Gulf or the Pacific Coast, as the Government will seek to divert as much construction work as possible from the Atlantic seaboard, where a badly congested condition now exists. Shipyards on the Great Lakes are being encouraged to take contracts for vessels of the smaller types and during the past week no less than 40 of 3500 tons each were placed with lake shipyards.

Chairman Hurley has been advised by William M. Piggott, president of the Seattle Manufacturers' Association, that the Pacific Coast Chambers of Commerce

and other business organizations, for the purpose of stimulating shipbuilding, will offer a bonus of \$5,000 to the men at work upon each steel ship that is completed in less time than is consumed in the construction of vessels of the same type in the East. There is a shortage of labor skilled in steel-ship construction on the Pacific Coast, and a special committee of Western business men, co-operating with agents of the Emergency Fleet Corporation, is about to canvass Western labor markets for the purpose of building up the working organizations of the shipyards having Government contracts.

The Government is preparing to co-operate with all well-equipped shipyards having contracts with the Fleet Corporation to the extent of assisting in solving the labor question, especially with reference to the housing of workers in proximity to the plants. In an authorized statement made before the Merchants' and Manufacturers' Association in Baltimore during the past week, Rear Admiral Francis T. Bowles, who has been serving as an aide to Admiral Capps, stated that the Shipping Board had discovered that the output of the Bethlehem Steel Corporation's shipyards at Sparrows Point could be increased 100 per cent with proper aid and that it had been decided to lend the Bethlehem corporation money to build 1500 homes for workmen near the plant. Incidentally, Admiral Bowles deplored the contracts heretofore made for wooden ships, which he said were "conceived in trouble and dissension."

Progress in Making Parts of Steel Cars

For shaping the heavier parts of steel railroad cars, such as center sills, bolsters, doors, etc., the hydraulic press is depended upon entirely, as explained by G. P. Bender, in an address at the recent convention in New York of the National Safety Council. The presses usually range in capacity from 250 to 1000 tons pressure, and where a great number of pieces of the same shape are required elaborate dies and tools have been worked out by the Ralston Steel Car Co., Columbus, Ohio, to enable a maximum amount of fabricating to be done with a single operation of the press.

Two of the most interesting of these developments have come in the manufacture of car doors and heavy pressed steel bolsters. In making the drop doors for flat-bottom gondola cars the original method was first to shear the plates to the blank shape and notch them, after which they were punched, flanged and trimmed, each operation requiring a separate machine and individual handling between each. By the skillful grouping of two dies under a 1000-ton hydraulic press, one equipped for punching and shearing and the other for flanging, an entire door is now completed each time the platen descends, thus reducing the five original operations to one.

When an order was received for 2000 cars to be equipped with pressed steel truck bolsters of $\frac{3}{4}$ -in. metal, a problem requiring considerable thought presented itself since metal of this thickness does not draw evenly when pressed hot. It was thus impractical to blank the plates to shape before pressing and as the top of the bolster was truss shaped after being formed the trimming of the flanges at that time was also difficult. To overcome these obstacles a shear blade was attached at the outside of the female die on both sides and corresponding blades were designed which were gagged in to work in conjunction with the female die. After the forming was finished the gags were thrown in and with the second movement of the top platen of the press the complete bolster was removed.

Several machine-tool salesmen in New York have been assisting United States recruiting officers in obtaining mechanics for shops to be built back of the army in France for the repairing of guns. The plan generally followed is to hold a noon meeting at manufacturing plants, calling together only those mechanics of draft age, to whom the proposition is explained. Comparatively few men are taken from each plant, so that manufacturers will not be seriously crippled. The so-called non-essential industries are the first to be visited. The gun shops alone will require 21,000 men.

BRAZIL'S FIRST STEEL

Made from Native Pig Iron in Whiting Converter
—Locomotive Parts Cast

THE first successful manufacture of commercial steel in Brazil, as announced in a cable dispatch in THE IRON AGE, Oct. 25, was accomplished in the Engenho de Dentro works of the Central Railroad of Brazil, about 10 miles from Rio de Janeiro, on Oct. 19. Up to this time all attempts to manufacture steel from native pig iron had not apparently been commercially successful. The railroad used a Whiting converter, purchased in this country, and though the steel was made for its own use for locomotive parts, the success of the undertaking is looked upon as demonstrating the commercial possibilities of the process and the feasibility of making steel in this way for market consumption. For the following information THE IRON AGE is indebted to F. H. Tackaberry, of the American Steel Export Co., who witnessed the test:

The Central Railroad foundry is located at its locomotive repair shops. As a part of its equipment it installed in 1914 two No. 3½ cupolas purchased from the Whiting Foundry Equipment Co., having a rated capacity of 5 to 6 tons per hr. For some years it has been making gray-iron castings ranging in size to 3000 lb. These have been satisfactory. Native pig iron with a mixture of about 40 per cent scrap iron and no steel scrap was used.

In November, 1916, Wonham, Bates & Goode, Inc., the New York agents of the Whiting company, received an inquiry from Dr. Silva Freire, subdirector of the fourth division of the Central Railroad, for complete No. 1 steel converter equipment having a capacity of 1 ton. This equipment was shipped in March, 1917, and its installation was completed Oct. 15 under the personal supervision of George P. Fisher of the Whiting company.

On Oct. 19, 1917, the first heat was blown. The charge consisted of native pig, analyzing as follows:

Silicon, 1.645 per cent; carbon, 3.50 per cent; phosphorus, 0.09 per cent; manganese, 1 per cent; Sulphur, 0.02 per cent.

About 20 per cent steel scrap, consisting of car springs, was added, and to insure a sufficient amount of silicon about 10 lb. of 50 per cent ferrosilicon was added.

Blast	1. 7:45 p. m.
Light	1.11:20 p. m.
Beginning of boil	1.12:00 p. m.
End of boil	1.14:40 p. m.
Finish	1.23:15 p. m.

Total time of the blow..... 15 min. 30 sec.

There were predictions that the experiment would be a failure, so preparation was made with care. Par-

ticular attention was given to the preheating of the converter and the ladle with fuel oil. The total time of the blow and of the different stages are given in the accompanying table.

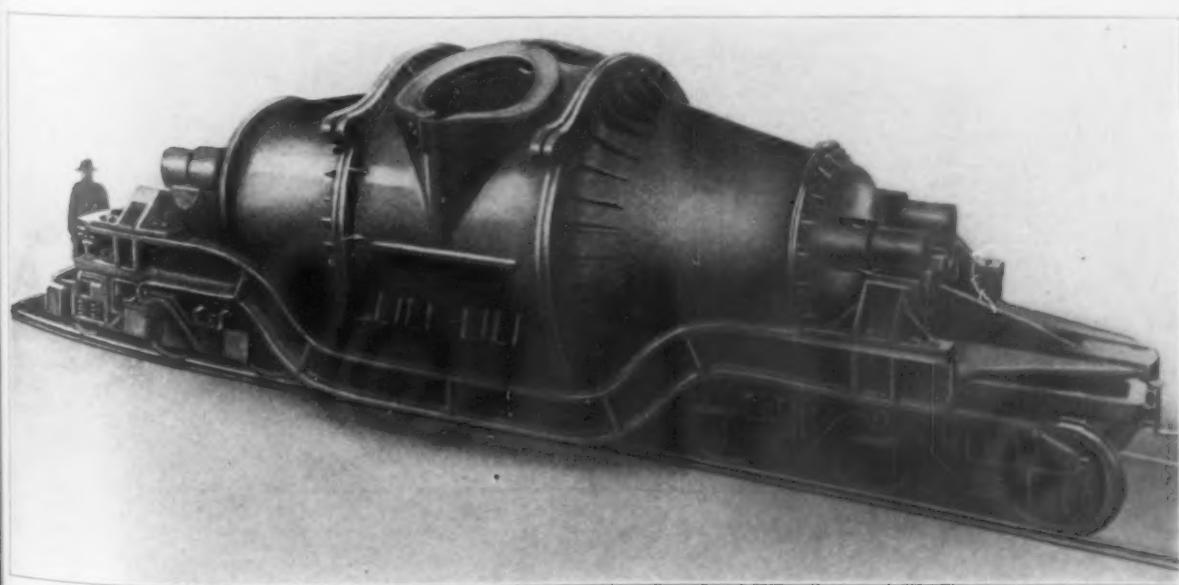
The charge was rebarburized with 10 lb. of native manganese ore running about 47 per cent manganese, and 22 lb. of 50 per cent ferrosilicon, added to the molten metal in the converter. The first steel casting poured was a locomotive coupler. A number of pieces have since been machined, showing a well-finished surface, and the fracture shows a fine, homogeneous grain. The following pieces were cast from about a ton of metal, the converter's capacity: Four brake-heads for type Pacific locomotives, four Climax couplers, two slide-rod guides for ten-wheel locomotives, and some brake shoes.

A New Large Capacity Hot Metal Car

A new type of car for transferring molten pig iron from the blast furnace to the steel plant has been designed by John D. Pugh, Title Building, Baltimore, Md. It is especially noteworthy for large capacity, thus conserving heat and minimizing sculling.

The car illustrated has a capacity of approximately 92 tons and it is pointed out that by increasing the length the capacity can be materially augmented without changing the side or overhead clearances. The body of the ladle is made up of flanged steel castings bolted together, which arrangement enables the sections to be separated and the entire lining removed if this should become necessary on account of the charge freezing or for any other reason. The ladle, which is supported and tilted on trunnions in the customary manner, is of circular construction which it is explained gives the maximum strength. The ladle trunnions are supported by two six-wheel trucks, the arch bars or frames being hinged to enable the three wheels on one side of the truck to bear equal loads. If desired the ladle body can be made of steel plate in place of the castings illustrated.

The capability of carrying a large amount of metal has, of course, the effect of reducing the dead weight of the cars required to transport a given tonnage with a corresponding decrease in the wear and tear on the equipment and cost of repairs. The opening in the top of the ladle is comparatively small in proportion to the capacity and it is explained that this form of construction tends to conserve the heat and insure the delivery of hotter metal. In a number of cases, although several hours elapsed between the time of charging the ladle and emptying it, the fluidity of the charge was found not to be impaired. The ladle is claimed to be entirely self-cleaning, as if it should not be entirely emptied at any time, the succeeding charges of metal will cut out all material left.



▲ Load of 92 Tons of Hot Metal Can Be Transported with a Decrease in the Loss of Heat and Without Sculling in a New Type of Ladle Car

A reduction in the length of the iron runners at the blast furnace and the number of spouts required for charging the car are secured, the number of the latter being decreased from four or six to two or even a single spout according to the size of car that is being charged. The cost of labor for cleaning the runners and the amount of scull left therein is, of course, cut down and as the size of the cast house building and floor is decreased with the shortening of the runners, the cost of construction will be lessened.

At the present time one of these cars is in use at the plant of the Jones & Laughlin Steel Co., Pittsburgh. It was built by the Treadwell Engineering Co., Easton, Pa.

Great Activity in Shipbuilding at Seattle

SEATTLE, Dec. 3—The steel shipbuilding plants in Seattle have increased their forces by 1800 men since the first of October, and the wooden plants have added 200 men, giving a total of 14,900 employees in the shipbuilding industry in the city. It is expected that from now on, the yards will record substantial increases each month, particularly in the wooden yards. The total monthly payroll of the industry in both steel and wooden plants amounts to \$1,600,000 as compared to \$1,400,000 two months ago.

Above figures relate only to shipyards, and do not include the hundreds of other plants in the city that are employed all or part time in contract work for the shipbuilding industry. It is estimated that these plants employ at least 3000 workers. The machine shops and foundries are working to capacity, and many of them are employing three shifts to keep up with the orders on hand.

The West Coast Lumbermen's Association has signed a contract with the United States Shipping Board for 40,000,000 ft. of ship timber, to be cut in Washington and Oregon mills and delivered to Gulf and Atlantic Coast shipyards.

The car shortage is becoming more serious daily, and it is reported that unless relief is obtained in Oregon shortly, that at least 20 mills, 50 per cent of whose output is war material, will be forced to suspend operations.

PLATE SHEARING MACHINE

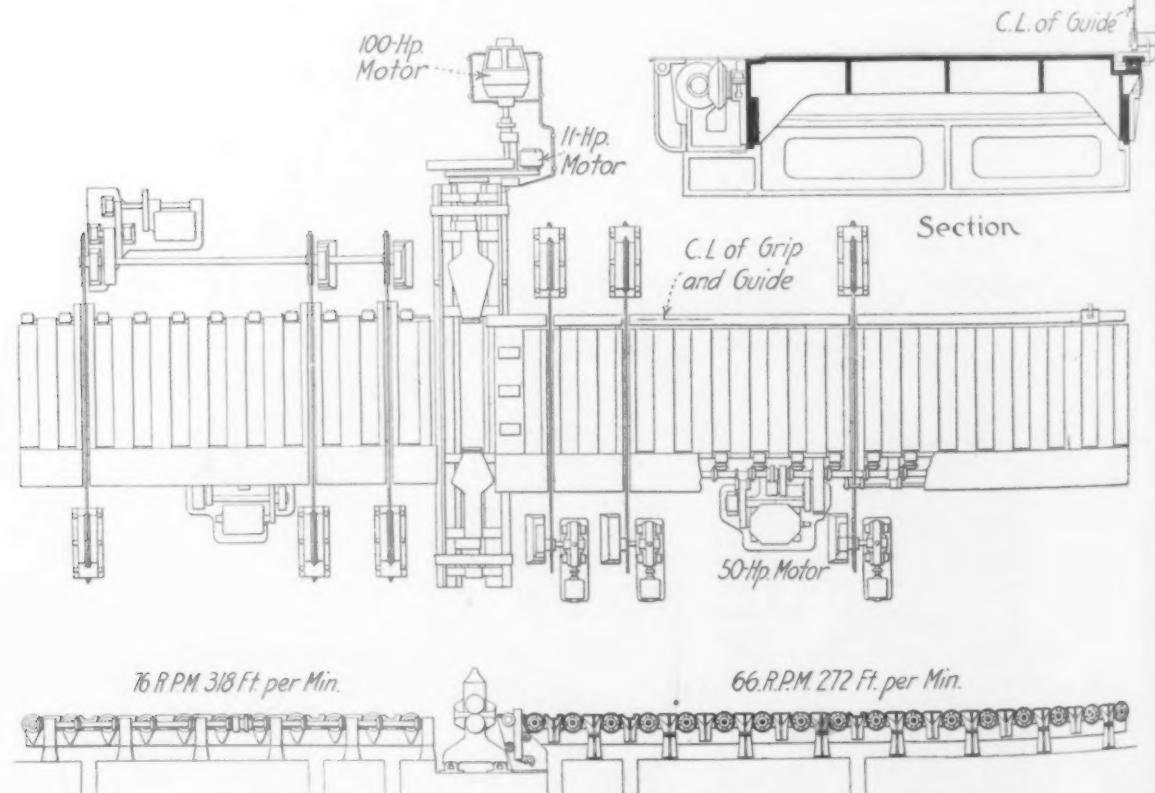
Double Rotary Type in Which the Material Is Held by a Sliding Grip

RECENTLY the R. L. Newbold & Son Co., Norristown, Pa., installed a double rotary plate shearing machine at the plant of the Republic Iron & Steel Co., Youngstown, Ohio. This machine, which is capable of handling material ranging from 18 to 100 in. in width and having a maximum thickness of 1 in., is equipped with a sliding grip and guide. This feature, it is pointed out, has overcome the objection formerly raised to the use of rotary shearing machines for plate trimming due to the fact that a straight cut was difficult to secure, to say the least. The application of the guide and sliding grip for holding the tail of the plate, it is emphasized, has solved the problem and enables a merchantable sheared plate to be produced within the capacity of the machine.

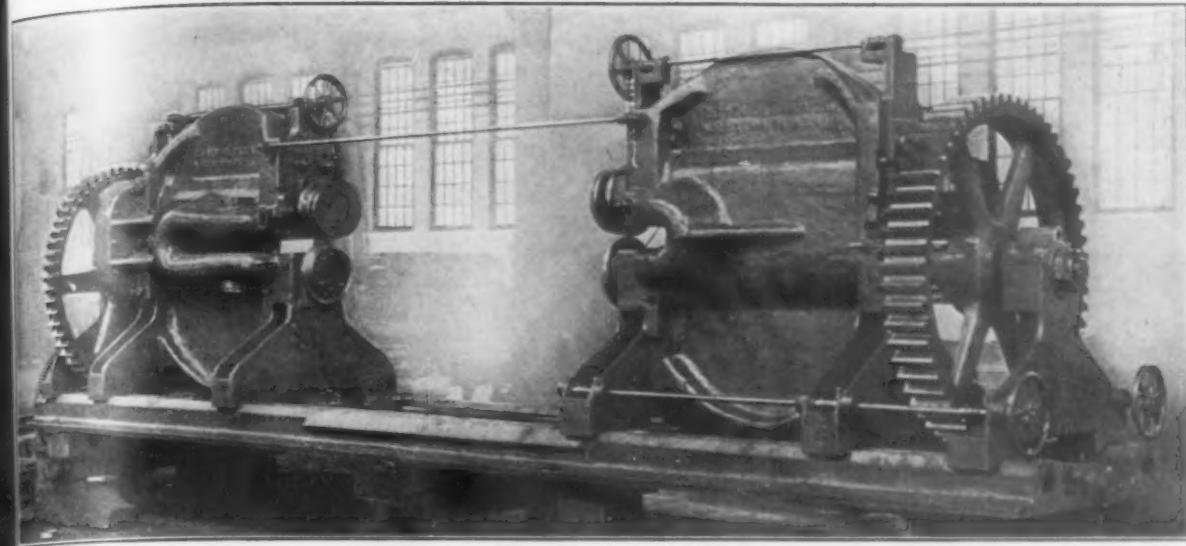
The sliding grip operates on a guide which is rigidly bolted to brackets on one side of the roller table provided with the machine. This grip bears down on the plates at one corner and is adjustable to take care of material ranging from $\frac{1}{4}$ to 1 in. in thickness. This adjustment is made by an eccentric pin on which the grip turns.

After the plate is delivered from the rolls of the rolling mill, it is sent through the leveler and passed out on the table in front of the rotary shearing machine. Here the plate is manipulated by the cross-over and the tail end caught by the sliding grip. The roller table, which is driven by a 50-hp. compound wound electric motor operating at 500 r.p.m., is started and the circular knives of the shearing machine draw the plate along over the rolls of the table, the power for these being transmitted through bevel gears at the end of the individual rolls connecting with corresponding gears on the shaft which is meshing through a set of gears with the motor. As the tail end of the plate approaches the shearing machine the handle of the grip comes in contact with a stop. This automatically releases the grip and permits the plate to go through.

A spring placed in the floor is employed in some cases to return the grip to the starting point and at



The Arrangement of the Tables, Crossovers and a Double Rotary Shearing Machine in the Plate Mill of the Republic Iron & Steel Co.



Steel Plates having a Maximum Thickness of 1 In. Are Sheared in Widths of from 18 to 100 In. in a Double Machine of the Rotary Type, the Use of a Special Grip for Holding the Material in Position Being Relied upon to Insure a Straight Cut

arrangement of counterweights or pulleys in others, although the arrangement recommended is to have the man operating the grip return it to the starting point. It is pointed out that by holding the end of the plate so that it cannot move while the other end is in shearing machine gives a straight cut.

The shearing machine consists of two units, one of which is fixed and the other movable. The construction of these units follows the conventional design for machinery of this type. The shearing machine is driven by a 100-hp. electric motor while the movable unit is adjusted by 11-hp. motor to take care of various widths of plates.

VERY BUSY AT DETROIT

Large Output While Preparing for Still Greater Production

DETROIT, Dec. 3.—Manufacturers of this district are expecting the greatest industrial activity that Detroit and the surrounding cities have ever had. War orders are pouring in, factories are being built to care for them, building of pleasure cars is increasing over the past few months, and Washington has promised there will be no Government interference in the production of automobiles nor in the use of freight cars for their transportation. Factories are still going through the period of adjustment, prior to the making of munitions. One of the largest automobile firms in Detroit reports the heaviest business in its history in pleasure cars. The Ford Motor Co. is increasing its production of material for the Government, and its factory, which employs from 30,000 to 40,000 men in normal times is expected to house one of the greatest war industries of the country. Dodge Bros. have increased their capitalization from \$6,000,000 to \$10,000,000, the increase to partly take care of the new factory being built for ordnance work. The Packard Motor Car Co., is increasing its production of war trucks and Liberty motors. The new Lincoln Motor Co., Detroit, is rapidly completing its factory for the making of Liberty motors. The Cadillac Motor Co. is working on its second large war order, but not curtailing the production of pleasure cars.

Purchases of real estate by large manufacturers show that the future is being anticipated. The Detroit Shipbuilding Works and the American Shipbuilding Co. are working to capacity, although handicapped by the lack of skilled labor. The Government has taken so many skilled mechanics from Detroit factories that there is general complaint of the dearth of skilled men. Unskilled labor at present surfeits the demand, but the training of new men for expert work is progressing rapidly. Transportation is much better than at this time last year, and money more obtainable than for some time.

Manufacturers Confer at Indianapolis

Representatives of 16 state associations attended a meeting of the National Conference of State Manufacturers' Associations at the Claypool Hotel, Indianapolis, Nov. 25. The sessions were closed. The object of the meeting, it was stated, was to discuss plans for closer cooperation between the manufacturers and the Government, to enlarge the scope of the conference and to provide for meetings of representatives of the state associations to discuss national as well as basic industrial conditions. Thirty members of the conference attended the meeting. John M. Glenn, president of the organization, was in the chair. At an open meeting preceding the closed session, addresses were made by Mr. Glenn and Harrison Riley of Washington, a representative of the department under the secretary of the treasury, which is directing the war financial operations. Mr. Glenn quoted extracts from President Wilson's address at the Buffalo convention of the American Federation of Labor, among them this: "I believe I am speaking not only of my own experience but of the experience of others when I say that you are more reasonable in a larger number of cases than the capitalists."

"I do not know what the president meant by these statements," Mr. Glenn said. "He has not made such a statement to the representatives of the men who have invested money in the plants. Is it clear to your minds what the President meant? There is no question," he said, "as to the responsibility that rests upon the manufacturers of the country, and there is no intention on their part to lie down on the job, no matter what kind of criticism emanates from Washington. The way for us to win control of the situation is to win the confidence of the people of the United States. When we have this we will have the administration at Washington with us." Mr. Glenn said the administration had uniformly been with public sentiment, that Washington had constantly kept its ear to the ground. In the face of all trouble, obstacles and criticisms, it is the duty of the manufacturers of the country, Mr. Glenn said, to stand up as one man and use every ounce of influence and every dollar of money they have for the country.

Mr. Riley said that some of the less essential concerns will have to close their doors in the interest of those manufacturing war munitions and supplies. He discussed the war certificates soon to be issued and suggested that manufacturers give these instead of the usual Christmas bonuses to their employees.

The following new officers were elected: President, R. H. Rice, General Electric Co., West Lynn, Mass.; vice-president, J. E. Frederick, Kokomo Steel and Wire Co., Kokomo, Ind.; secretary-treasurer, John M. Glenn, secretary Illinois Manufacturers' Association, Chicago.

Adjustment of Labor to War Needs

New Bureau Organized by Council of National Defense — Investigation of Causes of Industrial Unrest in England

WASHINGTON, Dec. 4.—The necessity for the speedy mobilization of labor for the more efficient prosecution of the war, a necessity that has become increasingly apparent during the past month and which now presents a problem to the administration no less serious than that involving the transportation of the country, has induced the Council of National Defense to create a bureau to be known as the Section on Industrial Service which will immediately undertake a comprehensive investigation to determine the steps that must be taken to bring about a proper adjustment of labor supply to the war needs. The council has designated as chief of the new section L. C. Marshall, at present dean of the School of Commerce and Administration of the University of Chicago. In order to secure a basis of facts on which to work out policies, Mr. Marshall has been directed to undertake the following work:

1. To determine present and probable future demand for labor in war industries.
2. To determine in connection with the priorities committee of the War Industries Board the relative priorities of the labor demand.
3. To arrange for the supplying of the demand through the Department of Labor or such other governmental or civilian agencies as can best meet the demand.
4. To determine the needs for dilution of labor including the introduction of women into industry and recommend policies to be followed in regard thereto.

Will Collect Information

In a statement issued by the director of the Council of National Defense, it is explained that it is not contemplated that there will be created under the council any agencies for executive action with respect to the problems concerned. The purpose is to have under the council a section to which these various labor problems may be brought for common consideration. The new section will work in close co-operation with the War Industries Board and its priorities committee and will, like the War Industries Board, bring to the council digested information from all Government departments as to the above subjects. Policies can then be worked out to secure the most efficient utilization of existing agencies and to facilitate the development of such new agencies as may be necessary.

Administration leaders here have been convinced for some time that energetic steps must be taken to deal with the labor problem as affecting those industries upon which the prosecution of the war chiefly depends. While the attitude of the majority of the labor leaders has been fairly satisfactory and while in general terms a full measure of co-operation has been pledged, yet in detail the results have been disappointing and present conditions are such as to cause great anxiety to the President and his advisers as well as to the business men of large experience who are assisting the Government in Washington. Strikes and threats of strikes in the coal mines, the shipyards, the machine shops and on the railroads have been more frequent within the past 90 days than at any time since the beginning of the war. In addition many spokesmen for labor are demanding "more liberal treatment" for the workers and are insisting that they be "guaranteed protection" against more or less imaginary encroachments upon their liberties. The eight-hour day, the curtailment of overtime and the maintenance of a standard wage whether paid to a skilled mechanic or to an unskilled temporary substitute are being demanded and the suggestion that in this great crisis labor, relieved of military duty, should be prepared

to make some sacrifice for the common welfare has been received with ill-disguised impatience.

Greater Flexibility Needed

The necessity for greater flexibility of the labor supply is a phase of this important subject which will receive special consideration at the hands of the new organization. The Council of National Defense has been working for many weeks in the effort to so co-ordinate the manufacturing establishments, the transportation facilities and the labor supply of the country as to obtain the best possible results and the maximum output of war material. It has been found necessary to enlarge plants located at a distance from good labor markets and the managers of these establishments have been obliged to go far afield in building up their organizations. Labor has shown an indisposition that is by no means unnatural to be transferred in a large volume from one part of the country to another; nevertheless, it is the opinion of many experienced manufacturers that an army of skilled mechanics available for use where needed would do more to hasten the production of war material and to relieve transportation congestion than any other possible agency.

The organization of such a force would prove a difficult and delicate task and it is a question as to whether it is practicable at this time. There is no thought of conscription in the minds of administration officials in connection with the work now being planned by the Council of National Defense, but the new section will undoubtedly give serious consideration to the desirability of increasing the flexibility of the labor supply in every conceivable way. It is more than probable that an effort will be made through the aid of the priorities committee of the War Industries Board to secure the speedy transfer from one point to another, on an entirely voluntary basis, of comparatively large numbers of skilled workmen who may be needed from time to time in certain establishments engaged upon war work.

Dilution of Labor

The dilution of labor which, in view of the experience of England and France, not to mention Germany, in the manufacture of war material, has demonstrated to be an ultimate necessity here, will be carefully studied from every point of view. The introduction of women into industry is not favorably regarded by the labor leaders but there can be no doubt that it must be effected to a very material extent if the war lasts long enough to permit the Government to exhaust the existing draft registers. The question of compensation, it is believed, will not prove a difficult one provided manufacturers are permitted to operate freely on a piece basis. There is not likely to be a disposition to withhold standard rates of pay from women simply because they are women, but it will hardly be practicable to secure an output from female labor on a per hour or per diem basis that would justify the payment of wage scales fixed for men's labor.

It should be clearly understood that the newly created bureau is in no sense an arbitration or conciliation tribunal. While it will have points of contact with both employers and employees, as well as with the managers of Government manufacturing plants and their workers, it will have nothing to do with labor controversies as such, but will concern itself with the formulation of broad policies to be put into execution by the executive officers of the various departments of the Government. Mr. Marshall, who will at once assume the duties of Chief of the Section of Industrial Service, is not only well equipped for his task, but is in close touch with the existing situation, having given much

time recently to the special consideration of labor matters as affecting certain procurement divisions of the War Department and thus takes up the new work with broad general information and special detailed knowledge of a number of the more pressing problems.

The British Report

As bearing on certain phases of the labor problem, which has numerous international aspects, the report of the British Commission of Inquiry into Industrial Unrest, which has just been reproduced by the Department of Labor, is of special interest at this time. The report is presented in eight sections, showing the results of inquiries in eight separate districts of Great Britain. The commission was appointed June 12, 1917, and the completed report was submitted July 17, 1917.

The reports for all the districts emphasize as the leading cause of industrial unrest the fact that the cost of living has increased disproportionately to the advance in wages and that food distribution is unequal. Another cause regarded as particularly serious is the restriction of personal freedom under the munitions of war acts, by which workmen have been tied up to particular factories and have been unable to obtain wages in proportion to their skill; in many cases the skilled man's wages were less than those of the unskilled. The requirement of "leaving certificates" was reported as one of the chief causes of dissatisfaction, but this restriction has been abolished by an order to the Minister of Munitions, effective Oct. 15, 1917, under which any munitions worker may leave his present employment for other war work by giving a week's notice, or such longer notice as is provided for in his existing contract of service.

Lack of Co-ordination

Dilution of labor and lack of confidence in the Government growing out of the surrender of trade-union customs and the fear that promises regarding the restoration of pre-war conditions will not be kept, are given special attention. It is stated that the irritation caused by the withdrawal of the trade card scheme under the Military Service Acts has subsided, but there remains much anxiety regarding the working of the schedule of protected occupations. All the reports refer to the lack of co-ordination between Government departments in dealing with labor, and considerable complaint on account of the delay in dealing with disputes and the difficulty of securing prompt awards is reported.

Besides the more general causes of industrial unrest, certain causes, such as inadequate housing, liquor restrictions, and industrial fatigue, are mentioned as acute in some districts. Mention is also made of lack of proper organization among the unions, inconsiderate treatment of women as regards wages, delay in granting pensions to soldiers, and inadequacy of compensation under the workmen's compensation act.

Important Recommendations

A number of recommendations are made by the commissioners. Of these the first is that there should be an immediate reduction in food prices, the increased cost of food to be borne to some extent by the Government, and that there should be a better system of distribution. The necessity of reducing hours, readjusting wages to a fairer basis for skilled as against unskilled workmen, the fuller use of trade-union machinery,

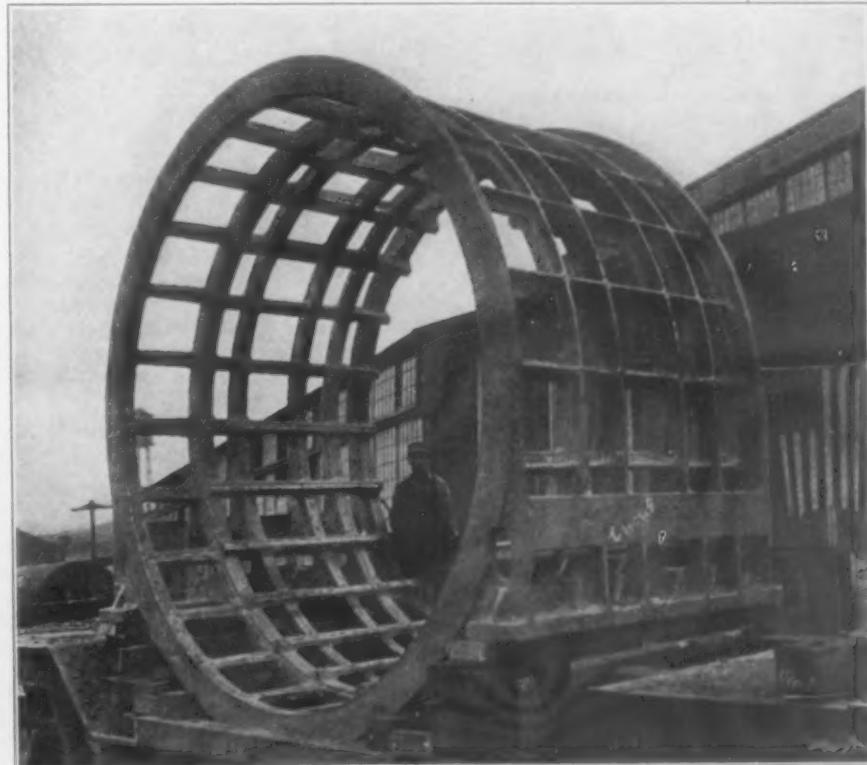
and renewal by the Government of the declaration that trade-union rights and privileges which have been interfered with on account of the war shall be restored after the war, are insisted upon. The commissioners strongly urge the adoption of the principle of the Whitley report for the establishment of industrial councils for each of the organized trades, such councils to be composed equally of employers and employees. Other recommendations are that compensation under the workmen's compensation act should be increased, that announcement should be made of the Government's policy as regards housing, that pensions committees should have larger discretion in their treatment of men discharged from the army, that the recruiting system should have most careful handling, that the work of Government departments dealing with labor should be more thoroughly co-ordinated, and that when an agreement is drawn up between representatives of employers' federations and trade-unions, it should be binding on all in the trade concerned.

While the report shows very clearly the prevalence and the nature of industrial unrest in Great Britain, it at the same time indicates that "there is a strong feeling of patriotism on the part of employers and employed throughout the country and they are determined to help the State in its present crisis." W. L. C.

Intricate Cast-Steel Motor Frames for Battleship Turbines

An unusual steel casting, which has been necessitated by recent developments in battleship construction, is shown by the illustration. It is one of a number of motor frames for the battleship turbines being built by the Westinghouse Electric & Mfg. Co. This particular motor frame and three companion ones were made for the U. S. battleship Tennessee by the Pittsburgh Steel Foundry Co. at its plant at Glassport, Pa.

Such a casting is an extremely difficult one to make in steel. This is true not because of its



Large Cast-Steel Motor Frame for U. S. Battleship Turbines as Made by a Pittsburgh Foundry

weight, but rather on account of its lack of weight, or particularly because of its great size and light section. Its production requires an enormous flask

and many hundreds of cores. Considering the molding space and time required, the return in actual weight is small, for the casting finished weighs only 23,660 lb. Its inside diameter is 12 ft. 6 in., not including feet or brackets. Its length is 7 ft. 3 in.

Because of these dimensions it presented an unusual problem in shipping. Were it placed on a regular gondola car there would not be sufficient clearance on railroad bridges. Therefore, a specially made car, of which there are only a few in this country, had to be provided for carrying it. The illustration also shows part of this car.

HIGH-SULPHUR CAST IRON*

Within Certain Limits It Increases the Strength of Soft Gray Iron

BY T. MAULAND

SULPHUR is considered cast iron's worst enemy, and many of the troubles of the foundry are laid to it whenever it happens to be high. Authorities say that sulphur combines carbon, increases hardness, shrinkage and chill; reduces strength; causes dirty iron, blow holes and shrinkage cracks and makes iron congeal quickly. Generally this is true, but my experience has been that sulphur within certain limits increases the strength in soft iron. For agricultural or similar classes of castings, specifications have called for a maximum sulphur of 0.08 or 0.09 per cent. The American Society for Testing Materials, I understand, is considering increasing this limit to 0.10 per cent.

In castings of this class sulphur is generally taken as an indication of the hardness. I have noticed, however, that castings with a higher sulphur, up to 0.12 per cent, will sometimes be good, strong and soft, while at other times, with the other elements the same, the castings will be hard with sulphur less than 0.09 per cent. It has been my experience that when using a mixture of, say, 55 per cent pig, 35 per cent home scrap and 10 per cent No. 1 cast scrap, and it became desirable on account of economy to substitute 0.12 to 0.15 per cent sulphur off-grade pig iron for the No. 1 cast scrap, I could use a mixture of 45 per cent pig iron, 35 per cent home scrap and 20 per cent off-grade pig. In other words, I would use 20 per cent off-grade pig in place of 10 per cent No. 1 cast scrap, although the average sulphur analysis of the scrap would be better than the off-grade pig. The analysis of the castings from the off-grade pig mixture would be the same, except that it would show a higher sulphur. But the iron would be just as good and soft as the lower sulphur iron made from the scrap mixture.

Sulphur in Steel

In steel, sulphur has had the same bad reputation that it has in the foundry. Bessemer steel specifications generally call for 0.08 per cent or less, and open-hearth specifications for 0.05 per cent or less, as the maximum sulphur limit. Dr. J. S. Unger of the United States Steel Corporation has made some extensive tests with high sulphur in open-hearth steel, and has showed that high-sulphur steel can be made with mechanical and working properties equal to that of low-sulphur steel.

Dr. J. E. Stead, the eminent English metallurgist, in a paper before the British Iron and Steel Institute, cites experiments with steel containing from 0.10 to 0.50 per cent sulphur with as good, or superior mechanical properties, as steel of lower sulphur. The following extract is taken from his paper:

It was proved long ago that manganese counteracted the effect of sulphur, but books have been written in which sulphur was condemned, and engineers and their experts read those books and copied them, so that even to this day steel rails, etc., of exceptional quality are rejected because the

*From a paper presented at the annual meeting of the American Foundrymen's Association in Boston, Sept. 25 to 28, 1917.

sulphur exceeds arbitrary limits, even when all mechanical tests proved that the material is perfect. Steel high in sulphur resembles wrought iron and is more or less fibrous. It is a fact that steel called free-cutting fibrous steel is used to-day and the peculiar properties referred to are due to the deliberate introduction of sulphur into the steel. Such material contains about 0.15 per cent sulphur. Sulphur, then, may be regarded as a friend when it is used intelligently and is not invariably the enemy it is represented to be.

Some High-Sulphur Iron Soft

Within the last few months I have run into some rather extraordinary cases of high sulphur iron showing up very soft. The casting used as a test piece was a small gray iron box or bushing 2½ in. long with a ¾-in. core. The lighter portion, including the upper end, is 3/16 in. thick. The heavier portion is ¼ in. thick. The ¾-in. cored hole is reamed to a 0.890-in. hole on a gang drill. This machining is done with a feed of 4 ¼ in. per minute. This casting is one that is very apt to cause trouble in machining on account of a hard upper edge in the lighter section. Ordinarily it is not safe to run this iron over 0.10 per cent in sulphur, and this casting has given trouble with sulphur as low as 0.08 per cent. In the cases just mentioned where the iron was satisfactorily soft the analyses were as follows:

Lot No.	Sulphur, Per Cent	Silicon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Total Carbon, Per Cent
1.....	0.156	2.11	0.44	0.70	3.39
2.....	0.143	2.12	0.44	0.70	3.47
3.....	0.145	1.93	0.46	0.40	—
4.....	0.170	2.09	0.44	0.40	—

The casting, the small box previously referred to, machined soft from all of the four lots.

The high sulphur in lots Nos. 1 and 2 was obtained accidentally. I had already tested the castings for softness, and was very much surprised that analysis showed such high sulphur. The high sulphur in lots Nos. 3 and 4 was obtained by using high-sulphur pig and adding sulphur to the molten metal. All sulphur determinations mentioned have been checked by at least one other laboratory besides our own.

Sulphur Not So Bad as Painted

The cases of good iron with high sulphur and many cases of poor iron of practically the same analysis but lower sulphur, lead me to believe that sulphur in itself is not nearly so bad as it has been painted. Where sulphur is blamed for poor iron, I do not say that this iron would not have been better had it been lower in sulphur, but I believe that in most cases iron higher in sulphur could be made that would give satisfactory castings.

I will not try to explain now why some high sulphur iron makes very good castings, but I am inclined to believe that oxygen, as described in papers written by J. E. Johnson, Jr., one of which was read before this association several years ago, has much to do with it. The oxygen in the four lots cited above was very low, but I have not had the opportunity to do enough work along this line to draw definite conclusions.

Generous Employees

The employees of the Wrought Iron Range Co., St. Louis, recently advised of a Christmas bonus aggregating something more than \$10,000, have voted unanimously to transfer the total sum to the Young Men's Christian Association war fund. The action of the employees was in response to an appeal from the Y. M. C. A. secretary stationed at Jefferson Barracks and the amount has already been turned over to the fund by President B. B. Culver of the company.

The Wagner Electric Mfg. Co., St. Louis, announces the opening of a sales office at 129 Church Street, New Haven, Conn., in charge of C. M. French, formerly the company's representative at Springfield, Mass.

The Peerless Tube Co., Bloomfield, N. J., manufacturer of collapsible tin tubes, has purchased 100 x 120 ft. adjoining its present factory and has begun the erection of a plant addition.

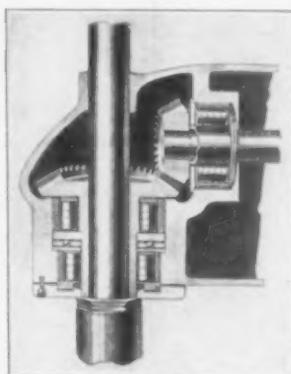
A 26-In. Vertical Drilling Machine

A new 26-in. high-duty vertical drilling machine has been brought out by the Buckeye Tool & Machine Co., New Philadelphia, Ohio. This is a single-column machine with a single-pulley drive, all inclosed gears and of rigid construction, and is designed for manufacturing purposes and to drive any high-speed drills within its capacity at maximum speed as well as for rapid and accurate production on tapping, facing, and counter-boring work. It has a flat working base and a round swinging table 22 in. in diameter that can be swung the full circle of the machine and out of the way when the base is being used.

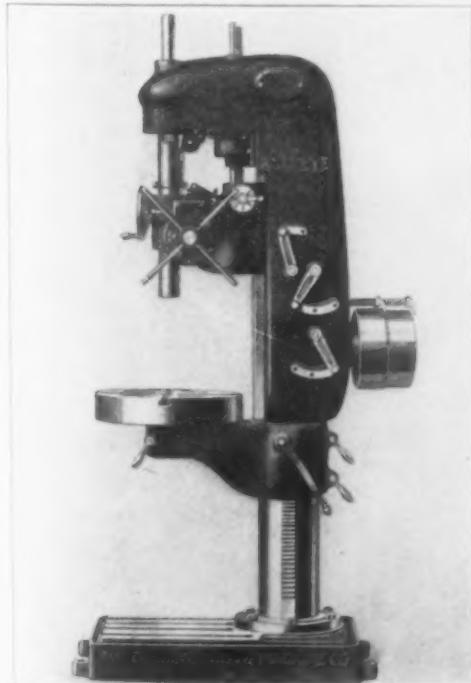
The driving gears are located in the upper half of the column and are controlled by three conveniently located levers, providing 18 spindle speeds ranging from 16 to 500 r.p.m., any one of these being instantly obtainable. The speed of the driving pulley is 460 r.p.m. The driving gears are mounted on a sleeve and assembled on the bench, being placed in the machine as a unit and held in place by a dead shaft. Wide face cut gears are used and run in oil in bronze bearings. Other bearings are of the Hyatt roller type. The crown gear Hyatt bearings are placed as near each end as practical with a ball thrust in the center. The crown, tapping and feed gears run in grease.

Six feeds are provided for each spindle speed, any rate being obtained by manipulating a single lever. The feed range is from 0.006 to 0.048 in. per revolution of the spindle. It is pointed out that the design is such that the machine is ready applicable for the use of a multiple-spindle head for drilling 2 to 10 holes at one time.

The spindle, which is of high carbon steel, is $2\frac{1}{2}$ in. in diameter in the sleeve, and 2 in. in diameter above the sleeve. The sleeve is $3\frac{1}{8}$ in. in diameter. The distance from the base to the spindle is 50 in. and that



A Combination of Roller and Ball Bearings Are Employed in the Head of a New 26-In. Vertical Drilling Machine



Three Conveniently Located Levers on the Upper Portion of the Column Control the Engagement of the Driving Gears and Provide for 18-Spindle Speeds Ranging from 16 to 500 R.P.M.

from the table to the spindle is 33 in. The travel of the table on the column is $18\frac{1}{2}$ in., the travel of the head on the column, 22 in., and that of the spindle in the head, 12 in. The column is 9 in. in diameter. The machine will drill in the center of a 27-in. circle. Having a heavy knee it can do the work of an upright milling machine by using a compound table which can be supplied. The spindle nose is slotted across the end for driving heavy boring and facing heads.

Given a Chance to Reciprocate

Concerning the purpose of the Administration to utilize the import license requirement to force countries receiving American exports to reciprocate by shipping more freely the commodities needed by the United States, the War Trade Board makes the following statement:

Control of imports was made effective by the allied Governments many months ago, the necessity therefor having become obvious if the resources of each were to be most effectively utilized for national and international demands. With the organization of the Bureau of Imports of the War Trade Board, the requisite machinery has been supplied for increasing the importation of certain indispensable commodities produced abroad.

Supplies now coming forward to this country are limited by reason of export embargoes imposed by foreign powers controlling the territory in which such materials originate. Such action was made necessary because of interference with normal production, as well as the extraordinary consumption caused by the war. Among notable examples of such materials may be mentioned tin, wool, rubber, ferromanganese, leather, flax and jute.

Prior to the enactment of the recent legislation there was no governmental agency especially designated to deal with the proper officials of other governments in order to procure the release of commodities required by the United States and which had been embargoed by other Governments. Governmental supervision of imports makes possible a more effective scheme of reciprocity and brings about a closer unity of the countries associated together in the war.

Heretofore the allied Governments were not in a position to know that all products exported by them to the United States would be utilized in a manner most conducive to the success of the great common enterprise.

With the extension of scope in the operations of the War Trade Board there is at hand a dependable medium through which the Allies will be enabled more effectively to express their willingness to reciprocate by making liberal shipments of commodities much needed by this country in exchange for the vast quantity of vital supplies which are going forward to them in an unending stream.

Officials and heads of the departments of the Chester Shipbuilding Co., Chester, Pa., and the Merchants' Shipbuilding Co., Bristol, Pa., were entertained at a banquet given by the company at Greene's Hotel, Philadelphia, on Nov. 26. W. T. Smith, general manager of the plants, had charge of the program. Speeches were made by L. T. Kniskern, assistant general manager of the Chester plant; B. D. Smith, assistant general manager of the Bristol plant; H. E. Frick, of the United States Emergency Fleet Corporation; Meyer Bloomfield, head of the United States Industrial Department of the United States Shipping Board; and Daniel Bloomfield, of Boston.

John P. Bech, formerly at 60 Wall Street, and Troels Fode have opened an office in the Woolworth Building, New York, under the name of Bech & Fode and will be metal brokers for the sale and purchase of any kind of metal such as spelter, copper, tin, lead, antimony and also tin plate. Mr. Bech was active in the trade during the campaign in 1915-16 against the high prices of spelter.

An example of the manner in which war business radiates from the principal contractor is presented by the working out of the contract which the Crane Co., Chicago, took for the sanitary and piping equipment for 16 National Army cantonments. Within less than three months, the Crane Co. obtained material from no less than 90 different outside sources.

A Glimpse of the Making of War



Testing Sheets for Stamping Quality



First Step in Forming Process



Steel Ready for the Dies



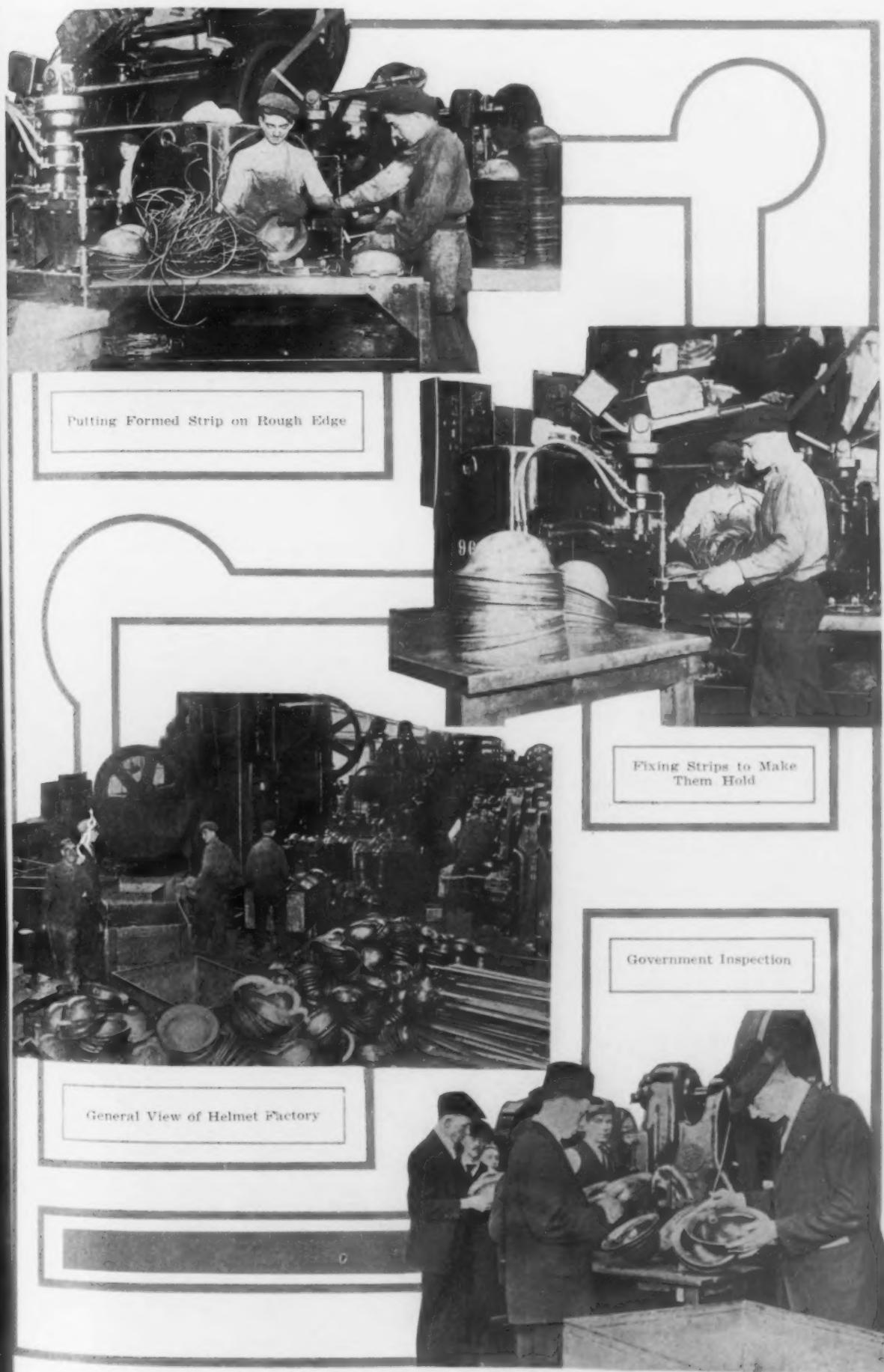
Helmet in the Rough



Rims Are Next Trimmed



Helmets in an American Factory



Photographs copyrighted by Underwood & Underwood

Mining Industry Would Amend Tax Law

Important Changes in Excess Profits Tax Proposed—Many Inequalities Pointed Out by Committee—Quarterly Payments Provided For

WASHINGTON, Dec. 4.—A comprehensive project for the construction and amendment of the war excess profits tax provisions of the war revenue act of Oct. 3, 1917, to meet conditions surrounding corporations engaged in the production of coal, gas, petroleum, iron ore and other minerals had been laid before the Treasury Department by a committee representing the National Coal Association. All branches of the mining industry are interested to an important degree in the problems concerning the application of the war excess profits tax, as the framers of the law appear to have taken little, if any, account of the peculiar conditions under which mining operations are prosecuted and especially the manner in which capital and tangible assets are affected by depletion or accretions through purchase or lease. It is understood that many corporations engaged in the production of a great variety of minerals are prepared to cooperate in this movement to secure the most favorable construction of ambiguous provisions of the existing law and in addition the passage by Congress of much needed amendatory legislation.

Section 207 of the war revenue act, if literally and strictly construed, the coal association's committee points out, will result in many inequalities and injustices and will tax at different rates corporations, partnerships, or individuals who should stand upon an equal footing. The section provides that "invested capital" in the case of a corporation or partnership means, first, "actual cash paid in." If the company was organized 20 years ago and \$100,000 in cash was paid into that company for its stock and the company used that \$100,000 to purchase property, its invested capital, so far as this part of the section is concerned, would be restricted to \$100,000, no matter what increase of value might have taken place in the property which was bought for \$100,000. Another company, organized 20 years later with a paid in cash capital of \$2,000,000, might invest that cash in another property absolutely identical in value with that of the first company, and on exactly the same earnings one company would get 20 times as much deduction as the other company.

Invested Capital Defined

Invested capital is further defined by the war revenue act to mean the actual cash value of tangible property paid in other than cash for stock or shares in such corporation or partnership at the time of such payment, with, however, an allowance for increase in value up to Jan. 1, 1914, but not to exceed the par value of the original stock or shares specifically issued therefor. Under this part of the section, a company which issued stock conservatively in the amount of the real value of the property would be limited to such amount, even though the property increased in value prior to Jan. 1, 1914, whereas a corporation which was grossly over-capitalized at the time of the purchase of its property for stock would get the benefit of the increased value of the property up to the par value of the stock issued.

These illustrations indicate how unfairly the law works with respect to the taxpayer. On the other hand, however, it is conceded that examples can readily be furnished of injustices to the Government. Property bought for stock or cash may decrease in value, but under the literal construction of the act, the company would get credit for the original price. If, for example, a company producing coal or iron ore had invested \$100,000, either in stock or cash in a property 95 per cent of which was worked out prior to Jan. 1, 1917, so that during the taxable year, this company was operating with only 5 per cent of its original property, it might, as the result of war conditions, make a very large profit out of such operation, but would be entitled to a deduction based on the original \$100,000.

Reorganized Companies

Similar cases might arise in connection with reorganizations of businesses which had failed and the reorganized company get the benefit of the capital of the original company. These and numerous other examples have led the committee to suggest the possibility of giving a liberal construction to this and other sections of the excess profits tax provisions of the revenue act, so as to result in the ascertaining of the real value of the assets of the corporation, partnership or individual subject to the tax.

Special emphasis is put by the committee upon the fact that the most common form of acquiring and operating coal, oil, gas, iron ore and other minerals is means of leases. These are commonly regarded as "tangible property." In many instances, they form the basis of capital issues. It seems advisable, therefore, that regulations should be promulgated by the Treasury Department, making it clear that such forms of property are "tangible property" within the meaning of section 207.

Important Assets

Accounts and bills receivable constitute one of the important assets of any business. It is advisable that proper regulations should be made in connection therewith; otherwise they might be construed as to be tangible property, for which the corporation would get only 20 per cent credit as provided in proviso (b) of section 207, although they may in fact constitute a part of earned surplus or undivided profits.

Another important phase of the proper construction of the excess profits tax concerns the definition of "surplus" and "profits." Increased value of property, it is contended, is a profit earned by the owner thereof. If it is not capitalized or distributed in dividends, it is an undivided profit or a surplus used and employed in the business or trade, and should be included in computing "invested capital." A corporation which owns or buys undeveloped mineral rights takes a risk which entitles it to profits, if any. By drilling, sinking shafts, building railroads, switches, driving entries, etc., once such rights are given a value in excess of the original cost, plus the cost of the development work. The enterprise may result disastrously, but if the development work proves up the property, at once the hazards of the investment are gone. The condition of quality of the coal or ore, the danger of flooding a mine with water, and the cost of drainage are factors and the product is at hand ready for mining and ready to be marketed.

Section 207, sub-division A-(1) and (2), covers the cost of the property, and sub-division A-(3) covers increased value or the profit resulting from the investment. This increase in value, it is urged by the committee, is a profit earned in the enterprise just as much as the excess selling price of the product minded of the production cost is a profit. A person who blocked up a field, bought the mineral rights, given time, energy and ability, and risked his money in development work is entitled to the increased value of his property as a profit, and entitled to include this profit in "invested capital" as "earned surplus and undivided profits used and employed in the trade."

Increase in Value

An increase in value due to proving up property or an accumulation of contiguous properties, or the use of capital or labor, is beyond question a profit which should be so considered in the determination of "capital invested." Certainly the accumulation of mining properties so that they may be made available in case

public need should not be discouraged, and the committee therefore suggests that appropriate regulations be adopted by the Treasury to permit such profits resulting from increase in value to be included in "invested capital."

The properties of the corporation, it is contended, have acquired a greater actual cash value, which certainly is an earned profit which the corporation is entitled to include in "invested capital." The increased value of a property of this nature is distinct and is emphasized by the fact that when the deposit is worked out, as it will ultimately be, the property itself, the mineral rights, are valueless and gone. This profit, therefore, is the difference between the amount of the original cost of the mineral rights added to the cost of development and its actual cash value.

In view of the great diversity of practice in the capitalizing and financing of subsidiary concerns controlled by a parent corporation, the Secretary of the Treasury is urged to give an equitable interpretation to the law in order that hardships may not result because of conditions which are purely accidental and which have not been brought about for the purpose of evading any statutory requirements. It is well known that in most cases a subsidiary company has very little capital and that its operations are financed entirely by the parent company; nevertheless, these subsidiaries are the real money makers in the business and if taxed under section 207, their nominal capital would subject them to a most unjust burden. To avoid such unfair taxation, it is suggested that parent and subsidiary companies may, without any unreasonable interpretation of the statute, be permitted to make a common, joint, or pooled return or report.

Quarterly Payments

The Secretary of the Treasury, in response to appeals made by many taxpaying corporations and by the representatives of large banking interests, has prepared an order authorizing that payments of war excess profits taxes may be made quarterly during the 12 months following the taxpayer's fiscal year. Many business men protested against the payment of these taxes at one time, the bankers, especially, claiming that it would cause a heavy drain upon the financial resources of certain districts.

W. L. C.

The Copper Industry in 1916

The principal features of the copper industry for 1916 are given by B. S. Butler, in U. S. Geological Survey Bulletin 666-Q on "Copper." The production of the primary refined copper in 1916 is given as 2,259,000,000 lb., of which 1,928,000,000 lb. was from domestic ores. These figures compare with an average for 10 years, including 1916, of 1,502,750,000 lb. and 1,201,400,000 lb. respectively. The 1916 imports were 462,000,000 lb. compared with 337,400,000 lb. for the 10-yr. average.

Exports of metallic copper in 1916 were 784,000,000 lb., comparing with a 10-yr. average of 735,500,000 lb. and with a high record of 926,000,000 lb. in 1913. Domestic consumption in 1916 is estimated at 1,430,000,000 lb. at an average per pound of 24.6c., which compares with a 10-yr. average of 773,000,000 lb. per year at 16.3c. per lb. The world's production is put at 3,078,000,000 lb. for 1916, with a 10-yr. average of 2,092,000,000 lb.

The terms of the order-in-council prohibiting the exportation of iron and steel products from Canada to countries other than Great Britain and British possessions and protectorates have been made public. The prohibition extends to pig iron, steel ingots, billets, blooms, bars and slabs; iron and steel plates; iron and steel shapes, comprising beams, channels, angles, tees and zees; iron and steel fabricated for structural work and shipbuilding.

The Steel Co. of Canada, Hamilton, Ont., has started work on its by-product coke oven plant of between 300,000 and 400,000 tons annual capacity.

TO ORGANIZE BY INDUSTRIES

New Committees of Manufacturers to Work with the Government

WASHINGTON, Dec. 4.—Representatives of all the industries of the country have been called to meet in Washington on Dec. 12 by the Chamber of Commerce of the United States to perfect plans for co-operation with the Government in the conduct of the war. These representatives, in the main, will be the chairmen of war service committees heretofore appointed at the suggestion of the chamber pursuant to a resolution adopted at the recent war convention of American business held at Atlantic City, which called upon the industries in their own behalf and in order to render the most efficient service to the Government to organize war service committees which should in each case be fully representative of the entire industry. An official statement on behalf of the Council of National Defense of the need for such action is contained in the following letter to the chamber from Director Gifford:

"I beg to assure you of the appreciation of this office and of the Council of National Defense of the steps taken by the Chamber of Commerce of the United States in the organization of war service committees. We feel that the establishment of representative committees, formed in such manner as to entitle them to speak for their entire industries, will render immediately available valuable sources of information upon which the Government may draw in connection with the countless business and industrial problems attendant upon the conduct of the war.

"For your information in this connection I will add that the several committees appointed by the Council of National Defense and by the Advisory Commission have in each instance tendered their resignations and, in order to prevent a continuance of the embarrassing situation wherein members of the committee were called upon to act both as Government agents or advisers and at the same time as representatives of their respective industries, that these resignations have been accepted. For the purpose of furthering the valuable work instituted by the Government committees, however, it is most desirable that representative committees of the industries be formed by the industries themselves at the earliest possible moment."

A large number of organizations have already completed the appointment of their war service committees and many have already established offices in Washington. The meeting on Dec. 12 will be for developing definite plans for the industries' representatives and in general to aid in the work which they will be called upon to undertake.

The National Chamber resolution calling upon industries of the country to mobilize asked that their committees be "made up of representative men in the industry, whether or not they be members of existing organizations" and further recommended that in all matters pertaining to any given industry the Government should deal with this group wherever possible, leaving to it, where practicable, the proper distribution of all orders for material.

British Need of More Iron Ore

Sir John Ferguson at the last meeting of Bolckow, Vaughan & Co. made a most interesting statement concerning iron ore. He thought the iron and steel manufacturers of Great Britain might, with advantage to themselves and to the national trade, act together in securing the control of some of the undeveloped deposits of iron ore, and he suggested that the government interest itself in the matter. There are very large deposits in Brazil which from a national point of view should be secured for future use.

G. W. Drach, architect, Cincinnati, is preparing plans for a hospital for the Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., a Birmingham suburb, estimated to cost \$420,000.

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EDITORS:

A. I. FINDLEY

WILLIAM W. MACON

GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

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Unwise Price Tinkering

From Washington comes word of the dissatisfaction of certain members of the Federal Trade Commission with the present schedule of iron and steel prices as agreed upon between the Government and the manufacturers. The time originally set for bringing up the question of continuing these prices was Jan. 1, which is less than four weeks distant. A few of the prices, including those of iron ore, pig iron and plates, structural shapes and bars, were promulgated on Sept. 24, or ten weeks ago. Considerable pig iron has been sold to foundries and steel works on the \$33 basis. The Government has bought large tonnages of plates and shapes for ships and of bars for shells at the new figures, and private buyers have done some business at the same prices, though the volume is small compared with that of the Government. A steel manufacturers' committee, at the request of the Government, has spent many days in the readjustment of market prices of a great variety of finished products to the new levels. The jobbers have been brought in line, and throughout the trade, with a few outstanding exceptions where the appetite for unusual profits would not be curbed, there has been an acceptance of the President's position that war demand must not be exploited for inordinate gain and that the steel capacity of the country must develop the largest production of which it is capable.

But now comes the complaint of members of the Trade Commission that their elaborate investigation of the cost of producing iron and steel in various forms, which it was announced six months ago would be made the basis of fixing Government prices, has gone for naught, and hence these commissioners want to see reductions from the schedules already fixed. Evidently the lesson of the price fixing on coal—and this was exclusively Government price fixing—has been lost on the commission. After weeks of effort to develop coal production on a \$2 basis had brought failure, the 45-cent increase was finally allowed. But it is a question to-day whether the small country coal openings which the \$2 price promptly closed can be made available again, after weeks of suspension. Their miners, who, as the fuel administrator said, would turn to the machine operated mines, have evidently not been

heard from in that connection, for coal output has decreased rather than increased.

The mistake was made of fixing a price too low to develop the full capacity of the country's coal mines. The same mistake can be made in the steel industry, already suffering seriously from lack of fuel due in part to the original insistence at Washington on a theoretical rather than a practical readjustment of coal prices. In the September conferences between iron and steel manufacturers and the War Industries Board the former made what most of them considered extreme concessions, and the so-called agreed prices were practically of the War Industries Board's own making. Because the manufacturers have accepted these prices and have gone to work in a broad spirit to make them effective, it would be a grave mistake for the Federal Trade Commission to reason that the next step is to apply the screws and then at intervals to give them a fresh turn downward.

The co-operative plan under which the Government and the iron and steel industries have now begun to work has accomplished much already. It stopped a runaway market and thus averted a situation that was full of danger. It secured for this country's allies prices for iron and steel well below what they had been paying. In the wise way in which the manufacturers have been carrying it out it has been a guarantee of a more stable market at home, and under their lead both producers and consumers have been carrying out the necessary readjustments with a minimum of disturbance to the industry. They should be allowed to go on for a period of months in the way in which they have begun. Any changes in costs of production that have come since the first price announcements of Sept. 24 have been to higher figures and overhead has increased with the cutting down of output. The effort to bring about reductions in market prices on Jan. 1 is ill-timed and mischievous and should not succeed. No excuse will be taken for a repetition of the blundering that has proved so costly in the Government handling of fuel.

Iron and steel makers might well consider more intensive advertising campaigns. If for purposes of rough comparison we say that steel making

capacity in this country has increased one-third in the last three years, that England's capacity shows a 40 per cent expansion and Germany's no one knows what, not to mention minor countries, there ought to be severe competition after the war. Advertising is a business expense; but if the outlay is not made the money goes in taxes to the Government. The industry can stand the expenditure, and each company should pick out some one product and try to establish a name and reputation for it. Brand names have long been a factor in pig iron selling and more could be done in giving them prestige. In respect to steel, it is sufficient commentary on the value of reputation that in the present price fixing program electrical sheet prices had to be named on qualities represented by well known trade names.

The Eastern Railroad Pool

The last test is being made to determine whether the physical facilities of the railroads are sufficient to handle the freight that is being offered them. Various half-way measures have been tried and found not entirely adequate, the partial failure leading up to the decision of the Railroad War Board, as approved by the War Industries Board, to operate all the railroad facilities east of Chicago as one pool. The decision was announced Saturday, Nov. 24, the direction being placed in the hands of seven vice-presidents, known as the General Operating Committee. Tuesday afternoon of last week offices in Pittsburgh were made ready, and on Wednesday morning the committee arrived in Pittsburgh and began issuing orders.

It is frankly admitted that the first orders issued were directed chiefly toward relieving the freight congestion in the Pittsburgh district, for the purpose of bringing about fuller operation of the iron and steel industry. Orders having been put into effect calculated to afford speedy relief in this one respect, the committee is now engaged chiefly in a broader program, seeking first of all to co-ordinate its work with other bodies "where necessary to secure progress."

It is recognized, of course, that some of the measures adopted may cause embarrassing conditions elsewhere. If a general embargo on the movement of through freight east and west through the Pittsburgh gateway and its diversion to lines north and south, as ordered a week ago, represented a complete step toward the furnishing of general relief to the whole traffic situation it could, presumably, have been taken some time ago. The results must be watched narrowly and other measures eventually taken in connection with this first step, which is distinctly an emergency step. On the other hand, some of the measures taken are permanent and dissociated from other matters, as, for instance, the annulment of the "Broadway Limited," which has already provided game worth much more than the powder.

A freer movement of Connellsville coke to the Pittsburgh district and points beyond and a freer movement of Pittsburgh district coal to Youngstown district steel mills seem to be assured. Unfortunately "freer" and "larger" movement in connec-

tion with coke, and to an extent with coal also, are not synonymous terms. It does not follow that the production of Connellsville coke, which has been about 17 per cent less this year than in the same period of last year, will increase precisely as additional supplies of cars are furnished. The railroads involved assert that they tried the experiment of more cars several months ago, and no more cars of coke resulted. The coke operators on their part explained that they were not given sufficient time to marshal increased working forces. It is believed at present, however, that with the two wage advances recently made and the termination of much outdoor work the Connellsville coke region can now muster much larger working forces than formerly. In recent weeks the production of pig iron, the production of steel, and to a large extent the production of munitions, have hinged upon the supply of coke, and occasional idleness of cars in the Connellsville region, awaiting loading, is relatively a small matter, when weighed against the large increase in production of pig iron, raw steel and munitions that would occur by reason of an enlarged supply of coke. The experiment should be prosecuted to the utmost extent.

The pooling of the eastern railroads is such a stupendous revolution that various measures for relief of traffic congestion, hitherto considered difficult or impossible, must be looked upon from a new viewpoint. The *Railway Age Gazette*, commenting in its last issue on its recent statement that a pool of the railroads was impossible until the anti-pooling laws were repealed, admits frankly that it was mistaken. If the impossible has been done, other things in the same connection can be done. The proposal that the Government, with its priority and other powers, secure and place on the tracks a large number of new locomotives and cars seems now quite a simple one, merely a detail in the utilization of the country's resources for prosecuting the war to the best advantage. The question who would own the equipment either now or after the war seems like a small matter. The pooling of the eastern railroads has raised much larger questions as to ownership, earnings, and so on, which must be answered now that the pooling is an accomplished fact.

As regards physical limitations, it is possible for the Government to secure the building of large numbers of locomotives and cars, for use on the roads, in a short time. A recent survey removed the chief uncertainty, whether plates would be available for standard type construction of freight cars. It has been found that there will still be a plate tonnage available after the full requirements of the merchant shipping program have been met.

There is no reason to suppose that the basic principle will be departed from, that the full operation of the essential industries, of which iron and steel are admittedly chief, must be secured. If the pooling of the eastern railroads does not entirely accomplish that desideratum, additional measures doubtless will follow, including a forced curtailment in the unessential industries. There is reason to expect that as long as pig iron and steel are scarce no effort will be spared to provide for an increase in production up to the physical limit of works capacity, which lies 10 per cent, possibly more, above the rate of production recently obtaining.

Railroad Securities and Pooling

It may easily be that through the great changes in railroad operation that are occurring the way will be made clear for a solution of the whole question of what we shall do with our railroads. Experiments are being conducted to determine what can be done with the material things—track, locomotives, and so forth—that are at hand. With such physical experiments the only thing to do is to try them and watch the results. There is another factor in this matter, however, that must be watched narrowly, and that is the financial. We can experiment by pooling all the miles of track, all the locomotives, all the other physical facilities, and see how best they can be operated to produce the maximum movement of freight; but we cannot try any corresponding experiment with railroad security values. The physical experiment is under the direction of the best railroad talent there is, with men placed in position where they can instantly order this thing to be done and that not to be done, and where they can try the effect of a given order for as many days or hours as appears best.

But no such means exist for regulating security values as disclosed by stock exchange transactions from day to day. It may be found highly desirable to establish regulation or control of these values. They should not be the football of the daily and temporarily uncertain results of the physical experiment of conducting the railroad pool. Wide fluctuations would be detrimental to the interests of both railroads and Government, if there is later to be a closer association between the Government and the railroads, and it is absurd now to assume that such a thing ought not to be considered as a possibility. Apart from the interests of either the railroads or the Government, wide fluctuations in security values are undesirable. The Federal Reserve Board may well consider the matter of exercising some control of market value of railroad securities while the General Operating Committee is conducting in the East its great experiment upon the physical properties those securities represent.

Increased Capital Demands

The output of the Baldwin Locomotive Works is now at the rate of 225 locomotives per month as compared with 160 per month in 1916. Since continually increasing activity is likely to require the continued employment of all the capital now in use in the business, the directors consider it inexpedient to increase loans in order to provide common stock dividends. An unusual situation is the employment of the company's works on export work for the Allies of this country to the exclusion of orders which American railroads need to place. It was stated recently that so far this year 4800 locomotives, or 90 per cent of the country's estimated output, have been commandeered by our Government for export to Allied countries, and that for orders placed now for domestic use the earliest delivery that could be had is the latter half of 1918. However, with chaos in Russia, it is entirely unlikely that the large locomotive orders for that country will be filled in the near future, so that there is a good prospect of speedier relief than

had been expected from the shortage of motive power at home.

The meeting of the Baldwin company's directors recently emphasized again the greatly enlarged capital demands of business in all lines. The effect of high prices in increasing capital requirements has been noted constantly in the past two years, but there is now the added effect of the necessity upon all manufacturers of accumulating large sums against the day when these must be turned over to the Government as taxes in the coming year. This necessity has operated and is still operating against the undertaking of extensions of plant and in some cases even the continuance of work on new construction begun earlier in the year. There have been cases of this in the iron and steel trades.

Higher Freight Rates on Iron and Steel for Western Roads

WASHINGTON, Dec. 4.—Important increases in rates on iron and steel were granted by the Interstate Commerce Commission to-day to railroads in western trunk line territory. The original petition of the roads sought to cancel commodity rates and apply fifth class rates, which would have resulted in increases all along the line ranging from 20 to 50 per cent. The proposed advances were regarded by the commission as excessive, and accordingly a varying scale of increases ranging up to 90 per cent of the fifth class rate was conceded. This will result in maximum advances of approximately 40 per cent, although the average will be much below that figure.

In justifying the advances allowed in to-day's decision, the commission declared that former rates on iron and steel were much too low in western trunk territory "owing mainly to the depression of the Chicago-St. Paul rate on competition with water carriers." Referring to the abnormally low rates prevailing on iron and steel in this territory, the commission said that "if the difference between class rate levels in central freight association and western trunk line territories may be taken as representative of transportation conditions generally, the proposed rates are not relatively high."

The new tariffs, which will be filed at an early date, will apply chiefly from Chicago, Peoria, St. Louis, Kansas City, Minneapolis, St. Paul, Duluth and Mississippi River crossings to various western destinations.

Representatives here of shippers in western territory express disappointment at the commission's decision, as they had protested vigorously against the proposed increases and believed they had presented a strong case.

W. L. C.

The Government's Large Needs for Toluol

The Government's requirements of toluol for the coming year are estimated at 22,000,000 gal. for conversion into tri-nitro-toluol and high explosives. The present annual output of the by-product coke ovens of the United States is put at the rate of 11,000,000 gal. or only 50 per cent of the quantity actually needed. Strenuous efforts are being made by Government officials and others to make up this deficiency. It is expected that this will be accomplished by a special method of scrubbing city illuminating gas, which was discussed briefly in THE IRON AGE, Nov. 22, 1917. The Ordnance Department of the Army has interested itself in the matter and it has been found that the remaining toluol needed must be secured from city gas.

The plant of the Southern Wisconsin Foundry Co., Madison, Wis., was destroyed by fire Dec. 1, the loss being estimated at \$50,000. Part of the company's business was supplying castings to the Steinle Turret Machine Co., Madison. The plant will be rebuilt at once.

FEDERAL CONTROL OF STEEL

Predictions that Pomerene Bill Will Pass, in View of President's Message

WASHINGTON, Dec. 4.—Many Senators and Representatives to-day predicted the passage of the Pomerene bill clothing the President with power to fix the prices of iron and steel or to require the output of the industry to be sold through a governmental agency, basing their confidence on the statement contained in the President's address to the joint session of Congress this afternoon relative to the necessity for specifically authorizing the Government to go beyond the limits of the Lever food, feed and fuel bill in the fixing of prices. In this connection the President said:

"Recent experience has convinced me that the Congress must go further in authorizing the Government to set limits to prices. The law of supply and demand, I am sorry to say, has been replaced by the law of unrestrained selfishness. While we have eliminated profiteering in several branches of industry, it still runs impudently rampant in others. The farmers, for example, complain with a great deal of justice, that while the regulation of food prices restricts their incomes, no restraints are placed upon the prices of most of the things they must themselves purchase; and similar inequalities obtain on all sides."

Notwithstanding the apparent confidence at the Capitol that the Pomerene bill will pass, there is little prospect that it will become a law before the expiration of the present mutual agreement as to iron and steel prices on Jan. 1. Conservative men in both Houses anticipate an extended debate on this measure and express doubt as to the outcome in view of the fairly satisfactory results of the voluntary agreement made by representatives of the steel industry with the War Industries Board.

Mechanical Engineers Hold War Meeting

War topics predominate at the convention of the American Society of Mechanical Engineers, now being held at the Engineering Societies Building, New York, discussions covering the shipbuilding problem, the aircraft problem, the fuel problem, etc.

Methods were considered whereby the problem of fuel conservation will be met either by compelling coal consumers to execute such measures of economy as the authorities prescribe, or else by disseminating correct information regarding the mining and consumption of coal, accompanied by an appeal to the patriotism of the consumers.

On Tuesday night honorary membership was conferred on Major-General George W. Goethals in recognition of his achievements in engineering, and Ex-President Taft addressed the engineers on the war's call to professional men.

Charles T. Main, Boston, a consulting engineer, has been elected president. He was born in Marblehead, Mass., in 1856 and was educated at the Massachusetts Institute of Technology. Since 1892 he has practised as a consulting engineer, with offices in Boston, until 1907 being associated with F. W. Dean in the firm of Dean & Main. He has designed and supervised the construction of numerous industrial, steam-power and water-power plants. Among his largest undertakings were worsted mills and four hydroelectric developments for the Montana Power Co., aggregating about 280,000 hp.

Germany is reported to have contracted for one and a half millions tons of hematite ore from Sweden for 1918. At present the vessels carrying the ore are convoyed by Swedish warships until they are picked up by German warships.

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SMALL PIG-IRON INCREASE

Youngstown Curtailment Made Up in Other Districts

A Net Loss of Ten in Active Furnaces in November

November pig-iron returns show an unexpected though slight increase in daily output. From the amount of banking forced by fuel shortage in the Youngstown district, a considerable falling off was looked for, but other districts made up the deficiency. The output for the month was 3,205,794 gross tons, or 106,859 tons a day for the 30 days, compared with 3,303,088 tons in October, or 106,550 tons a day. Continued poor working compelled the blowing out of a good many furnaces last month and the number active on Dec. 1 was 345 with a capacity of 106,953 tons a day as against 355 furnaces with a daily capacity of 109,059 tons on Nov. 1. There was thus a net loss of 10 furnaces and a reduction of 2100 tons a day in the capacity.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from November, 1916, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel Works	Merchant	Total
November, 1916	80,141	30,253	101,394
December	74,264	28,273	102,537
January, 1917	72,394	29,249	101,643
February	65,280	29,193	94,473
March	73,731	31,132	104,863
April	79,031	32,134	111,165
May	77,561	32,677	110,238
June	76,805	32,197	109,002
July	76,440	31,380	107,820
August	71,436	33,336	104,772
September	73,290	31,175	104,465
October	76,664	29,886	106,550
November	77,135	29,724	106,859

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces in November and the three months preceding:

	Monthly Pig-Iron Production—Gross Tons			
	Aug. (31 days)	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)
New York	178,841	182,171	202,939	188,760
New Jersey	21,315	25,169	27,397	28,205
Lehigh Valley	111,583	110,418	117,523	110,758
Schuylkill Valley	91,236	75,727	80,478	80,121
Lower Susquehanna and Lebanon Valley	88,295	84,758	90,386	91,022
Pittsburgh district	664,141	638,611	656,731	663,909
Shenango Valley	164,709	140,205	161,615	148,617
Western Pennsylvania	213,731	211,513	218,814	203,256
Maryland, Virginia and Kentucky	83,233	90,466	100,446	93,653
Wheeling district	124,627	118,195	122,066	112,685
Mahoning Valley	300,740	309,570	316,906	274,788
Central and Northern Ohio	272,109	271,519	275,996	266,718
Hock. Val., Hang. Rk. & S. W. Ohio	59,577	62,499	64,061	66,334
Chicago district	503,723	457,330	455,045	481,537
Mich., Minn., Mo., Wis. Col. and Wash.	105,486	108,325	117,397	112,266
Alabama	232,355	222,687	260,469	251,694
Tennessee and Ga.	32,246	24,791	24,769	31,471
Total	3,247,947	3,133,954	3,303,038	3,205,794

Among furnaces blown in in November were Genesee in New York, one Bethlehem in the Lehigh Valley, one Donora in the Pittsburgh district, Graham in Virginia, one Ashland in Kentucky, one new Gary in the Chicago district, and LaFollette and Chattanooga in Tennessee.

The list of furnaces blown out last month includes one Niagara and Burden in New York, one Duquesne, one Edgar Thomson, one Isabella and one Eliza in the Pittsburgh district, Hall in the Shenango Valley, Colonial in western Pennsylvania, one Bellaire and Top Mill in the Wheeling district, two Ohio and two Hubbard in the Mahoning Valley, one Central and one Lorain in northern Ohio, Globe and Union in the Hanging Rock district, one Miami in the Chicago district, Irondale in Washington, one Bessemer and one Sloss in the Birmingham district.

Capacity in Blast Dec. 1 and Nov. 1

The following table shows the daily capacity in gross tons of furnaces in blast Dec. 1 and Nov. 1 by districts:

Location of furnaces	Total number of stacks	Coke and Anthracite Furnaces in Blast		
		Dec. 1 Number in blast	Capacity per day	Nov. 1 Number in blast
<i>New York:</i>				
Buffalo	18	18	5,801	18
Ferro	1	0	0	1
Other New York	4	3	224	3
New Jersey	4	4	911	4
Ferro	1	1	30	1
<i>Pennsylvania:</i>				
Lehigh Valley	21	15	3,749	14
Spiegel	2	2	222	2
Schuylkill Val.	13	9	2,606	9
Spiegel	1	1	90	1
Lower Susquehanna	8	6	1,786	6
Spiegel	2	2	97	2
Lebanon Val.	8	7	880	7
Ferro and Spiegel	3	2	87	2
Pittsburgh dist.	53	49	22,134	48
Ferro and Spiegel	4	2	256	4
Shenango Val.	19	16	4,519	17
Western Pennsylvania	25	24	6,569	24
Ferro and Spiegel	3	2	78	2
Maryland	4	4	1,525	4
Ferro	0	0	0	0
Wheeling district	14	10	3,756	12
<i>Ohio:</i>				
Mahoning Val.	26	20	9,368	24
Central and Northern	26	23	8,810	25
Hocking Val.	1	1	1,885	15
S. W. Ohio & Hanging Rk.	17	13	1,885	2,066
Illinois and Ind.	38	34	15,755	33
Ferro	1	0	0	1
Michigan, Wis. & Minn.	12	10	2,720	10
Colorado, Mo., & Wash.	7	4	1,025	5
Ferro	1	1	145	1
<i>The South:</i>				
Virginia	16	12	1,620	13
Ferro	3	3	125	1
Kentucky	5	4	715	3
Alabama	37	32	8,310	32
Ferro	1	0	0	1
Ten. & Ga.	16	12	1,155	10
Total	415	345	106,953	355

Production of Steel Companies

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies show the following totals of steel-making iron month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Pig, total production				
	1915	1916	1917	1915	1916
Jan.	1,115,944	2,251,035	2,244,203	18,041	24,866
Feb.	1,237,380	2,183,845	1,829,846	13,319	23,877
Mar.	1,551,082	2,365,116	2,285,430	12,274	29,388
Apr.	1,584,111	2,316,768	2,370,937	12,337	31,862
May	1,694,290	2,408,890	2,404,380	13,440	35,844
June	1,770,657	2,295,784	2,304,155	19,200	38,597
July	1,949,750	2,306,303	2,369,630	17,854	31,353
Aug.	2,101,818	2,313,122	2,214,513	27,463	33,338
Sept.	2,129,322	2,309,710	2,198,705	23,159	29,451
Oct.	2,281,456	2,530,806	2,376,589	23,992	34,566
Nov.	2,198,459	2,404,210	2,314,857	28,741	44,975
Dec.	2,283,047	2,294,620	—	25,004	43,470

The Record of Production

Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1913—Gross Tons

	1913	1914	1915	1916	1917
Jan.	2,795,331	1,885,054	1,601,421	3,185,121	3,150,938
Feb.	2,586,337	1,888,670	1,674,771	3,087,212	2,645,247
Mar.	2,763,563	2,347,867	2,063,834	3,337,691	3,251,352
Apr.	2,752,761	2,269,655	2,116,494	3,227,768	3,324,960
May	2,822,217	2,092,686	2,263,470	3,361,073	3,417,349
June	2,628,565	1,917,783	2,380,827	3,211,588	3,270,055
July	2,560,646	1,957,645	2,563,420	3,224,513	3,342,428
Aug.	2,545,763	1,995,261	2,779,647	3,203,713	3,247,947
Sept.	2,505,927	1,882,577	2,852,561	3,202,366	3,133,954
Oct.	2,546,261	1,778,186	3,125,491	3,508,849	3,303,028
Nov.	2,233,123	1,518,316	3,037,308	3,311,811	3,205,794
11 mo.	28,740,494	21,533,700	26,459,244	35,861,705	35,253,063
Dec.	1,983,607	1,515,752	3,203,322	3,178,651	—
Total, yr.	30,724,101	23,049,752	29,662,566	39,039,356	—

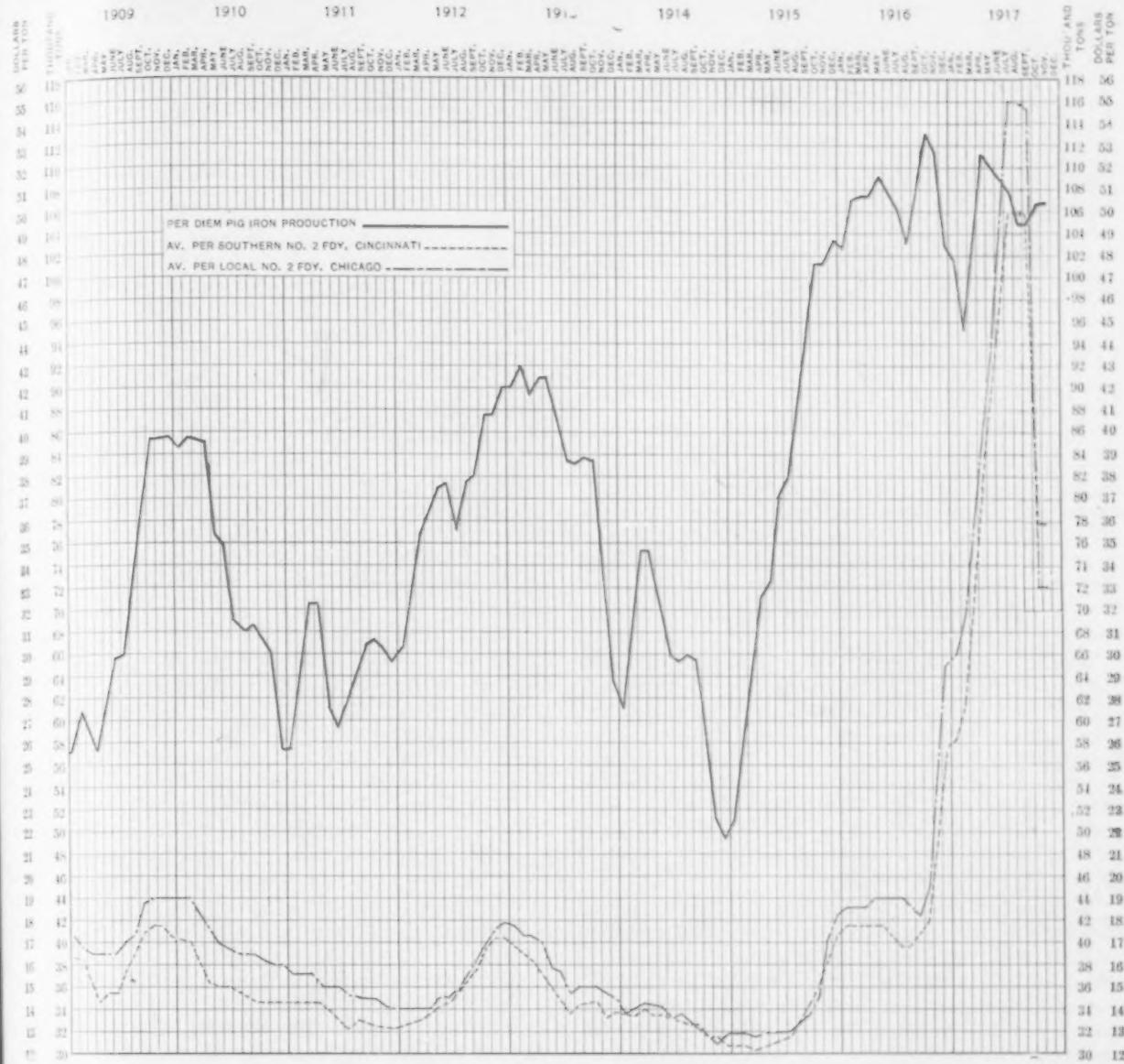


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from Jan. 1, 1908, to Dec. 1, 1917; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

The figures for daily average production, beginning January, 1910, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1910—

	1910	1911	1912	1913	1914	1915	1916	1917
Jan.	84,148	56,752	66,384	90,172	60,808	51,659	102,746	101,643
Feb.	85,616	64,090	72,442	92,369	67,453	59,813	106,456	94,473
Mar.	84,459	70,036	77,591	89,147	75,733	66,575	107,667	104,882
Apr.	82,792	68,836	79,181	91,759	75,665	70,550	107,592	111,165
May	77,102	61,079	81,051	91,039	67,506	73,018	108,422	110,238
June	75,516	59,585	81,358	87,619	63,918	79,361	107,053	109,002
July	69,305	57,841	77,738	82,601	63,150	82,691	104,017	107,820
Aug.	67,963	62,150	81,046	82,057	64,363	89,666	103,346	104,472
Sept.	68,476	65,903	82,128	83,531	62,753	95,085	106,745	104,465
Oct.	67,520	67,811	86,722	82,133	57,361	100,822	112,189	106,559
Nov.	65,659	66,648	87,697	74,453	50,611	101,244	110,394	106,859
Dec.	57,349	65,912	89,766	63,987	48,896	103,333	102,537	.....

Diagram of Pig-Iron Production and Prices

The fluctuations in pig-iron production from January, 1909, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production by months of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of THE IRON AGE.

Three Blast Furnaces Idle

CHICAGO, Dec. 5 (By Wire).—Three blast furnaces of the Illinois Steel Co., South Chicago, are shut down as the result of a fire in a gas main last night. The full extent of the damage is not determined, but it is hoped that operations will be resumed within a day or two.

Blast Furnace Notes

The Indiana Steel Co. blew in its new No. 2 furnace at Gary, Ind., Nov. 4, making a total of 11 furnaces in the Gary group.

The second of the two Iroquois furnaces operated by the Miami Metals Co. at South Chicago, Ill., in the production of ferromanganese blew out Nov. 28.

Stack D at the Maryland plant of the Bethlehem Steel Co. at Sparrows Point, Md., blew out for partial relining Nov. 3 and resumed operations Nov. 25.

The furnace of the Clinton Iron & Steel Co., Pittsburgh, was out of blast 21 days in November for relining.

An American Arsenal in France

WASHINGTON, Dec. 4.—Plans are being made by the Ordnance Bureau of the War Department to establish an arsenal at the United States military base in France. This establishment will consist of two departments, one of which will be utilized for the repair of small arms and the other for the relining of big guns. The big gun department will include foundry and forging facilities and a well equipped machine shop. Secretary Baker will speedily announce the name of the officer who will be assigned to command the arsenal and will detail a number of experts from the Ordnance Bureau in this city. The statement published in the daily press to the effect that Major General William Crozier, chief of the Ordnance Bureau, will have personal charge of the arsenal is denied by Secretary Baker.

Iron and Steel Markets

SURPRISING OUTPUT

November Better Than Expected in Pig Iron and Steel

Pig Iron Scarcity Accentuated—Railroad Difficulties Increase

Pig-iron statistics for November show an unexpected, though very slight, increase in the daily rate. For the 30 days the total was 3,205,794 tons, or 106,859 tons a day, against 3,303,038 tons in October, or 106,550 tons a day. So much has been made of the banking down of furnaces at Youngstown last month, due to coke shortage, that a serious falling off was looked for. But other districts made up the loss, which turned out to be only about 10 per cent from the Youngstown output of October.

So many furnaces have been working badly, due to frequent bankings and in part to poor coke, that more are compelled to go out for relining. The net loss was 10 in November, and the 345 furnaces active Dec. 1 had a capacity of 106,953 tons a day, against 109,059 tons a day for 355 furnaces on Nov. 1. November just wiped out the October gain of 10 in active stacks.

Railroad difficulties continue the most serious handicap of blast furnaces and steel works. The Youngstown situation is better, but Pittsburgh is now affected more than in November by lack of coke, and there and in Ohio the Steel Corporation to-day has 20 furnaces banked. Steel production has been kept up heretofore by drawing on pig-iron stocks, but now the reserve of pig iron has been used up. In November some steel companies surprised themselves by a larger rolling-mill output than for October.

The first effect of the pooling arrangement of Eastern railroads has been the cancellation of many permits both for export and domestic shipments of pig iron and steel, some plants meanwhile having practically no outlet. The special effort to facilitate the movement of ore, coal and coke will work for betterment in the raw-material supply, but the problem of freight congestion, particularly at Pittsburgh, promises to dominate the steel industry for months.

New calls for cost sheets have come to steel producers in the past week from the Federal Trade Commission, and fresh agitation of Government control and of price reductions comes from the same quarter, as the Pomerene bill is brought up for Congressional action. Added to all the troubles encountered in production and distribution, the possibility of fresh price unsettlement just as the new schedule was becoming effective makes the outlook by no means encouraging.

Government buying continues large, but chiefly in pursuance of programs already outlined. The past week has seen considerable orders for plates and for forging steel for shells, but thus far little is heard of new contracts for shell steel for the Allies.

Additional rails have been bought for shipment to France—about 15,000 tons. In a recent pur-

chase of rails for a great storage operation in New Jersey the Government paid \$55, but as high as \$73 was paid by a domestic road on 2500 tons for delivery in the early months of 1918. The urgent need of rails for increased siding and terminal facilities is bringing rail prices more nearly in line with those for shell rounds, which are largely a rail-mill product.

In the plate trade it is a growing belief that the Government will take all sheared plates $\frac{1}{4}$ in. and heavier after April 1. Recently Government orders for 50,000 to 60,000 tons of universal plates were placed with Youngstown mills and for some time plate shipments to the Government by one Pittsburgh company have been at the rate of 60,000 tons a month.

Most sheet mills have now covered their large trade for first quarter or first half of next year, and the Government is a liberal buyer both for export and domestic needs. Tin plate contracts for the first half have been generally closed and in some cases a full year's supply has been covered, the price for the second half to be adjusted later.

Billets and sheet bar offerings by large producers are much restricted. One large steel company in the Central West has sold no semi-finished steel in months, apart from its regular contracts. A 25,000-ton sheet bar sale has just been made by a Pennsylvania mill for delivery over the next three months.

Pig iron consumers are buying for next year in a way indicating that they expect difficulty in getting sufficient metal. The scarcity of iron for early delivery is growing more acute, and but for the agreement with the Government the spot market would doubtless be well above the \$55 point at which the September agreement found it. Many furnaces are sold up for the first half and are now selling only for third quarter or second half. Urgent inquiry for basic iron in lots of 10,000 tons and more has appeared in the East and Middle West.

Domestic production of ferromanganese fell off sharply in November and British exports to this country are becoming inconsiderable. British producers seem unable to supply even the Canadian demand in full.

Lake Superior ore shipments to Dec. 1 were 61,585,402 tons and with favorable weather the December movement may reach 1,500,000 tons, or a total of 63,000,000 tons—much nearer than was expected to the total of 64,734,000 tons moved by water last year.

Pittsburgh

PITTSBURGH, Dec. 4—(By Wire).

The fuel situation in the Youngstown district is better and industrial operations in that district this week will be on a larger scale than for some time. However, the situation is still very far from being satisfactory and the output of the steel mills there is very little over 75 per cent of capacity. The Youngstown Sheet & Tube Co. has one Hubbard and one furnace at East Youngstown idle, and the Carnegie Co. has two of the Ohio stacks down for lack of coke. So far the Republic Iron & Steel Co. has been able to operate its five blast furnaces at Hazleton, but has very little coke ahead.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 5.	Nov. 28.	Nov. 7.	Dec. 6.
	1917.	1917.	1917.	1916.
No. X, Philadelphia...	\$34.25	\$34.25	\$34.25	\$28.50
No. 2 Valley furnace...	33.00	33.00	33.00	30.00
No. 2 Southern, Cin'ti...	35.90	35.90	35.90	25.90
No. 2, Birmingham, Ala...	33.00	33.00	33.00	23.00
No. 2, furnace, Chicago*	33.00	33.00	33.00	28.00
Basic, del'd, eastern Pa...	33.75	33.75	33.75	30.00
Basic, Valley furnace...	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh...	37.25	37.25	37.25	34.45
Malleable Bess., Ch'go*	33.50	33.50	33.50	28.00
Gray forge, Pittsburgh...	32.75	32.75	32.75	29.95
Le. S. charcoal, Chicago...	37.50	37.50	37.50	31.75

Rails, Billets, etc., Per Gross Ton:

Bess. rails, heavy, at mill	....	....	....	\$38.00
O-h. rails, heavy, at mill	....	....	....	40.00
Bess. billets, Pittsburgh...	47.50	47.50	47.50	55.00
O-h. billets, Pittsburgh...	47.50	47.50	47.50	55.00
O-h. sheet bars, P'gh...	51.00	51.00	51.00	55.00
Forging billets, base, P'gh	60.00	60.00	60.00	80.00
O-h. billets, Phila....	47.50	47.50	47.50	60.00
Wire rods, Pittsburgh....	57.00	57.00	57.00	65.00

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	3.685	3.685	4.685	2.909
Iron bars, Pittsburgh....	3.50	3.50	3.50	3.25
Iron bars, Chicago.....	3.50	3.50	4.50	2.75
Steel bars, Pittsburgh...	2.90	2.90	2.90	3.00
Steel bars, New York...	3.095	3.095	3.095	3.169
Tank plates, Pittsburgh...	3.25	3.25	3.25	4.25
Tank plates, New York...	3.445	3.445	3.445	4.419
Beams, etc., Pittsburgh...	3.00	3.00	3.00	3.25
Beams, etc., New York...	3.195	3.195	3.195	3.419
Skelp, grooved steel, P'gh	2.90	2.90	2.90	2.85
Skelp, sheared steel, P'gh	3.25	3.25	3.25	3.00
Steel hoops, Pittsburgh...	3.50	3.50	3.50	3.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Hall and Atlantic furnaces of the Republic company have both been blown out for relining, taking advantage of the present shortage in supply of coke. In the Pittsburgh district operating conditions are very little better than they were last week. Measures are being taken to facilitate the movement of ore, coal and coke and food supplies over the railroads east of Chicago, and as soon as these are put in effect the present greatest freight congestion ever known in this district will be relieved. The committee of vice-presidents of the Eastern railroads has opened a suite of ten offices in the Union Arcade Building, in this city, and has already put in effect a movement to facilitate the bringing of ore in quicker time from lower lake ports to the Pittsburgh districts. One plan is to use more motive power and this will be done. This committee has also decided that foodstuffs shall have the right of way over coal, steel or any Government freight on the Eastern railroads. With this committee working here and the coal sub-committee at Cumberland, Md., freight conditions in the Pittsburgh district are expected to be very much better within a short time. Some Pittsburgh manufacturers, in order to relieve the freight congestion, are advocating a plan of shutting down all the manufacturing plants of the country for a period of two weeks, or from Saturday, Dec. 22, 1917, until Monday, Jan. 7, 1918. Two holidays are in these two weeks and it is figured that such a shutdown would allow the railroads to clean up congested freight, the manufacturers to ship out goods piled in stock awaiting cars, and would also allow a large supply of coal and coke and other products to be hauled to the mills and furnaces to provide against future possible shortages. The plan has been advocated so strongly that a meeting of manufacturers who are members of the local Chamber of Commerce has been called to be held in this city on Friday, Dec. 7, to take action on the matter. However, it is a question whether plants running on war materials—and practically all

Sheets, Nails and Wire, Per Lb. to Large Buyers: Cents. Cents. Cents. Cents.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	4.00
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	5.50
Wire nails, Pittsburgh...	3.50	3.50	3.50	3.00
Cut nails, Pittsburgh...	4.50	4.50	4.50	2.95
Fence wire, base, P'gh...	3.25	3.25	3.25	2.95
Barb wire, galv., P'gh...	4.35	4.35	4.35	3.85

Old Material, Per Gross Ton.

Old Material, Per Gross Ton.	Dec. 5.	Nov. 28.	Nov. 7.	Dec. 6.
	1917.	1917.	1917.	1916.
Iron rails, Chicago....	\$37.00	\$36.50	\$35.00	\$29.00
Iron rails, Philadelphia...	38.00	38.00	38.00	25.00
Carwheels, Chicago....	30.00	30.00	27.00	21.50
Carwheels, Philadelphia...	34.00	33.00	29.00	22.50
Heavy steel scrap, P'gh.	30.00	30.00	30.00	26.00
Heavy steel scrap, Phila.	27.00	27.00	25.00	24.00
Heavy steel scrap, Ch'go.	28.00	28.00	28.00	23.50
No. 1 cast, Pittsburgh....	28.00	28.00	27.00	20.50
No. 1 cast, Philadelphia...	31.00	31.00	28.00	20.00
No. 1 cast, Ch'go (net ton)	23.50	23.50	21.00	16.50
No. 1 RR. wrot, Phila...	35.00	35.00	35.00	26.00
No. 1 RR. wrot, Ch'go (net)	31.25	31.00	31.00	26.00

Coke, Connellsville, Per Net Ton at Oven:

Coke, Connellsville, Per Net Ton at Oven:	Furnace coke, prompt...	Furnace coke, future...	Foundry coke, prompt...	Foundry coke, future...
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$7.50
Furnace coke, future...	6.00	6.00	6.00	4.00
Foundry coke, prompt...	7.00	7.00	6.00	7.50
Foundry coke, future...	7.00	7.00	6.00	5.00

Metals,

Metals,	Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	23.50	23.50	23.50	24.50	
Electrolytic copper, N. Y.	23.50	23.50	23.50	34.50	
Spelter, St. Louis....	7.75	7.75	7.62 1/2	12.50	
Spelter, New York....	8.00	8.00	7.87 1/2	12.75	
Lead, St. Louis....	6.37 1/2	6.37 1/2	6.12 1/2	7.40	
Lead, New York....	6.50	6.50	6.25	7.50	
Tin, New York....	80.00	80.00	68.00	44.37 1/2	
Antimony (Asiatic), N. Y.	15.25	14.00	14.00	14.00	
Tin plate, 100-lb. box, P'gh.	\$7.75	\$7.75	\$7.75	\$6.00	

Pittsburgh manufacturing plants are doing so—would be allowed to shut down for two weeks as the loss in output would be too great. General conditions in the steel trade show no important change. The amount of new business being placed with the mills is relatively small and for two reasons. One is that the mills are sold up for months and cannot take care of new orders, and, in addition, under present conditions in freight movement and fuel supply, they are unable to ship out material as fast as it should be moved. They believe that it is best not to take on more new orders until these two very unsatisfactory features of the market have been greatly improved. The Government prices on fuels, pig iron, semi-finished and finished steels are being quoted on all new inquiries, but buyers find it is almost impossible to get any material for prompt delivery.

Pig Iron.—Predictions are made that were it not for the Government prices ruling in the pig iron market since September, basic and Bessemer pig iron would be selling at \$100 per ton or more. All the large steel companies are still trying to find pig iron, but with very little success. The shortage in supply of coal and coke is cutting down output of pig iron very materially and the situation is likely to get worse before it is better. This, in turn, is restricting output of steel just at a time when it is so badly needed. On Dec. 1, the Carnegie Steel Co. had a number of blast furnaces banked for lack of coke, these including one Clairton, one Duquesne, two Edgar Thomson and one Isabella stack. There have been no large sales of either Bessemer or basic iron, simply for the reason that they cannot be had. A moderate amount of foundry iron is being sold, and the scarcity in supply is causing some consumers to try to cover their needs of pig iron for the first half of 1918. Several large consumers of foundry iron have bought fairly large lots for first half delivery, but furnaces are selling very

cautiously not knowing what they may be up against in the near future as regards supply of coal and coke. One sale of 1200 tons of No. 2 foundry is reported at \$33, Valley furnace, equal deliveries over first six months of next year.

We quote as follows: Basic pig iron, \$33; Bessemer, \$36.30; gray forge, \$32; No. 2 foundry, \$33; No. 3 foundry, \$32.50, and malleable Bessemer, \$33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—The new demand for billets and sheet bars is very active, but intending buyers find it almost impossible to find any mills that will sell steel for fairly prompt delivery. In fact, two of the larger steel companies are actively scouring the market trying to find ingots, slabs or billets, and say they will be glad to buy steel in any form, and practically in any quantity to help out. Dealers have been offered commissions on any purchases they can make, but report they cannot find it. The Carnegie Steel Co. is taking care of its regular customers in billets and sheet bars to the best of its ability, but has not sold any steel in the open market for some months.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$47.50, sheet bars \$51, and forging billets \$60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Ferroalloys.—The new demand for ferroalloys of all kinds is quiet, consumers feeling there is no incentive to contract ahead, as they will be able to obtain what they need from time to time instead of making contracts for six months or a year ahead, as has been the custom in the past. We continue to quote 80 per cent domestic ferromanganese at \$240 to \$250 for any delivery, and 18 to 22 per cent spiegeleisen at about \$60 delivered. We quote 50 per cent ferrosilicon for prompt shipment at \$150 to \$160, while on contracts, prices are \$140 and higher, depending on the quantity wanted.

We now quote 9 per cent Bessemer ferrosilicon at \$51.70, 10 per cent \$55, 11 per cent \$58.30, 12 per cent \$61.60. We quote 6 per cent silvery iron \$40, 7 per cent \$42, 8 per cent \$44.50, 9 per cent \$47, 10 per cent \$50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of \$2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—No large inquiries are out in this district, and the amount of new work being placed for non-Government work is very small. The Pittsburgh-Des Moines Steel Co. has taken 250 tons for buildings at the Langely aviation field in Virginia. Neither of the two local structural mills is quoting for prompt delivery, both being filled up for some months. We quote beams and channels up to 15 in. at 3c. at mill.

Steel Rails.—The new Government prices on light rails announced two weeks ago apply not only on new light rails rolled from billets, but also on rerolled light rails, prices on both grades being the same. Both the new and rerolled light rail mills are filled up for months and new inquiry is light.

We quote light rails, 25-lb. and heavier, at 3c. per lb.; 16-lb. and 20-lb., 3.45c.; 12-lb. and 14-lb., 3.90c., and 8-lb. and 10-lb., at 4.35c. for full carload lots, f.o.b. Pittsburgh; for less than carload lots, down to and including five gross tons, 0.045c. extra, and small lots under five gross tons, 0.09c. extra, all per lb., f.o.b. Pittsburgh.

Plates.—Recently Government orders for 50,000 to 60,000 tons of universal plates were placed with the mills in the Youngstown district. Local plate mills are running largely on Government orders, and since its new Liberty plate mill at Homestead was finished, the Carnegie Steel Co. has been furnishing 60,000 tons or more of plates per month to the Government. Here and there a small plate mill can be found that can ship out plates fairly promptly, and some business is being placed with these mills at the regular Government price. We quote $\frac{1}{4}$ in. and heavier sheared plates at 3.25c. Pittsburgh.

Sheets.—The new demand for sheets from domestic consumers is heavy, and most mills have covered their large trade for first quarter and first half of next year, except on galvanized sheets, sales of which are being restricted to first quarter. The Government continues to place heavy orders for sheets, and a recent inquiry was closed for 10,000 to 12,000 tons, most of which is being

shipped abroad. The demand for sheets from the automobile trade is very dull, and this will release to other consumers a large quantity of sheets that otherwise would have gone to this trade. It is said that the average output of sheets of all grades at present is probably not over 70 per cent of capacity. This is due to the shortage in steel, cars and also labor. It is also true that some concerns which have sheet and tin plate mills are concentrating their efforts to getting out a maximum output of tin plate. Leading makers of sheets say that they do not desire any change in prices made, as they believe it will be unwise to open the price question again, as it would have the effect of unsettling the trade. While the 6.25c. price on galvanized sheets is regarded as low it is likely that present Government prices on all grades of sheets may stand for the next year or more. Detail prices on sheets are given on page 1391.

Tin Plate.—Mills have covered their trade on tin plate for first half of 1918, and in some cases have taken contracts for second half, the prices to be adjusted later, and if no change is made in the Government price of \$7.75 for first half, this price will also stand for second half of next year. The export demand is active, but most concerns are refusing to quote on export business. There still remain some contracts for tin plate for export taken as long ago as late in 1915 and during 1916, which have not been cleaned up, and shipments on some of these contracts are still going forward. Leading tin plate makers say they are absolutely confident that the output this year will not only be large enough to fully meet the demand for containers of non-perishable foods, but will also be large enough to take care of the heavy buying expected by the Government for shipment to our allies. The present output of tin plate is estimated at close to 95 per cent of capacity in spite of the shortage in cars, steel and the often trouble in getting pig tin promptly. We quote coke plate at \$7.75 per base box f.o.b. Pittsburgh for Bessemer or open hearth stock. Prices on terne plate, output of which next year will no doubt be relatively small, are given on page 1391.

Iron and Steel Bars.—The new civil demand for iron and steel bars is only fair, but mills are sold up for some time, and have not material to offer for prompt delivery. Consumers whose stocks are low, and who are trying to buy either iron or steel bars for prompt shipment, say they cannot find mills that will accept their orders. The demand for reinforcing steel bars is dull, due to the large falling off in building operations all over the country. We quote steel bars at 2.90c. and refined iron bars 3.50c. in carloads, f.o.b. mill, Pittsburgh.

Wire Rods.—The domestic and export demand for wire rods is active, and several mills are practically sold up and are not seeking new orders. On a recent inquiry for about 500 tons of soft Bessemer or open-hearth rods for shipment to Canada \$75 per ton, or higher, was quoted. Prices of rods for export are arbitrary, the mills quoting whatever they see fit. On domestic orders all mills are quoting the \$57 price for soft rods, and the supply available is limited. The demands of the Government on the steel mills are so heavy that some concerns rolling rods and wire products are running light in these departments, diverting more of their raw steel to other products, on Government orders. Prices on rods are given in detail on page 1391.

Wire Products.—The new demand for wire and wire nails is reported by mills to be active, and some mills have their output well under contract over first quarter of next year. There is still a feeling in the wire trade that Government prices were lower than they should have been, and there is some agitation for a change to a higher basis about Jan. 1, but it is not believed this will be effective. The conservative element in the trade believes it would be wrong to stir up the matter of prices and make a change, as this would have the effect of unsettling trade conditions again. Small mills that buy rods and pay \$57 for them claim they cannot draw wire and make wire nails and average a fair profit. The export demand for wire and wire nails is fairly heavy, and the Government is plac-

ing fair-sized orders for its own use and also for the Allies. Mills report that on any export shipments of wire and wire nails they are able to make they realize much higher than domestic prices. Recently wire nails for export were sold at very close to \$4.75 base, per keg, f.o.b. dock New York City. It is very probable the output of wire and wire nails will be more or less restricted over the next three or four months, as concerns are badly in need of steel for Government orders. Prices on wire and wire nails being quoted by all the mills are given on page 1391.

Nuts and Bolts.—Most of the new orders being taken by local makers of nuts and bolts are either direct or indirect Government business, new buying by domestic consumers being light. Some contracts for nuts and bolts placed some time ago were readjusted to the basis of the new Government discounts, while others were not changed. Makers report that steel is coming in promptly, and output of nuts and bolts at the present is running very close to 100 per cent of capacity. The Government discounts, which are standard on all orders, are given on page 1391.

Rivets.—Makers report the civil demand is very dull, while Government orders, both direct and indirect, are heavy and constitute nearly all the new business that is being placed. As noted before, contracts for rivets placed sometime ago at higher than the Government prices have been readjusted to the new Government basis, so that all buyers are receiving their rivets at the same price. We quote structural rivets at \$4.65 and cone-head boiler rivets at \$4.75 base, in carloads, f.o.b. Pittsburgh.

Hoops and Bands.—At the time the Government prices on hoops and bands were given out, mills were sold up six to eight months or longer, with the result that the new demand is quiet. Any mills that may be in position to furnish hoops or bands promptly are quoting the Government price of 2.90c. on steel bands, extras as per the steel bar card, and 3.50c. on steel hoops, f.o.b. Pittsburgh.

Shafting.—The Government is doing really all the new buying in shafting, the demand from domestic consumers being very dull. Makers report that the screw stock machine and the automobile trades are buying practically no shafting, and shipments on contracts made some time ago with automobile builders are being held up. It is estimated that the Government is taking 50 per cent or more of the entire output of shafting at present, which is much lighter than usual owing to the fact that the plants of three makers have been closed for some time due to labor troubles. The discount of 17 per cent on shafting makes the base price \$4.15 per 100 lb. on 2-in. to 3-in. rounds. We quote cold rolled shafting in large and small lots at 17 per cent off list, f.o.b. Pittsburgh.

Cold Rolled Strip Steel.—Makers report the new demand fairly active, and the large consuming trade is pretty well covered over the next 60 to 90 days. As before noted, some consumers who had made contracts at 9c. per lb. had these readjusted to the basis of 7c., this being the price quoted by makers of cold rolled strip steel prior to the time the Government prices came out. It is not believed there will be any change in prices on cold rolled strip steel on Jan. 1, as the present price of \$6.50 per 100 lb. is held by manufacturers and consumers to be eminently fair.

We quote cold rolled strip steel at \$6.50 and hot rolled at \$4.50 per 100 lb., f.o.b. Pittsburgh, terms 20 days, less 2 per cent off for cash in 10 days, when sold in quantities of 300 lb. or more.

Hot Rolled Strip Steel.—Makers report they are adhering absolutely to the new Government price of \$4.50 per 100 lb. on hot rolled strip steel, but it is claimed this price is none too firm.

Railroad Spikes.—Makers report the new demand for railroad spikes from railroads as being very dull, but from the jobbing trade as fairly active. We now quote standard sizes of railroad spikes at 4.50c.; 1/2-in. railroad spikes, 5.50c. base; 3/4-in. and 7/16-in., 6c. base; 5/16-in., 7c. base, per lb., f.o.b. Pittsburgh.

Wrought Pipe.—On lap weld iron and steel pipe mills are sold up for some months, but on butt-weld sizes can

make fairly prompt shipments. The new demand for butt-weld pipe all over the country is dull owing to the large falling off in building operations. The Government is a fairly large buyer of steel pipe, through the subcommittee on tubular products, and those orders are being filled and shipped promptly. It is very gratifying to state that the iron and steel pipe mills have given their utmost support to the Government in turning out and shipping its orders for pipe promptly. Very little lap-weld pipe is available for delivery before the second half of next year.

Discounts on iron and steel pipe are given on page 1391.

Boiler Tubes.—Nearly all the new buying in boiler tubes is on Government direct or indirect orders. One leading maker of boiler tubes and seamless steel tubing is turning over 75 per cent or more of its output to the Government and has many thousands of tons of boiler tubes on its books for the new Government ships being built at the various yards. It is said none of the boiler tube mills can take on new orders for delivery before late next year. Discounts on iron and steel tubes are given on page 1391.

Coke.—The car supply in the coke regions last week was very little better and is still very far from being satisfactory. The recent action taken by the railroads in appointing a general committee of vice-presidents of eastern roads, which has its offices in the Union Arcade building, this city, and also the sub-committee on coal and coke movement which has its offices in Cumberland, Md., it is expected will soon put the movement of coal and coke on a better basis. All the blast furnaces in the Pittsburgh and valley districts are suffering for lack of coke and on several days last week some coke producers did not get more than 10 to 15 per cent of the number of cars they needed. The new demand for furnace coke for prompt shipment is very active, but only a limited amount is available and it is almost impossible to get cars in which to ship it. We quote furnace coke at \$6; foundry, \$7, and crushed coke over 1-in. size \$7.30, all in net tons at oven. The output of coke in the upper and lower Connellsville regions for the week ending Nov. 24 was 316,017 tons, an increase over the previous week of 9777 tons.

Old Material.—Following the recent purchases of heavy steel scrap by the Carnegie Steel Co. and the Sharon Steel Hoop Co. the local scrap market has again quieted down and very little material is being sold by dealers to consumers. In fact, dealers say they would just about as soon not do any business under the present unsatisfactory railroad conditions. They also say it is almost impossible to pick up scrap and make shipment of it, and sell it at the prices fixed by the Government and realize a profit. The railroads are practically refusing to furnish cars for shipments of scrap, even when it is shown that the scrap is to be used in making steel for Government purposes. All the railroads have embargoes on, and are refusing to receive loaded cars of scrap from other roads. There were no important sales of scrap the past week.

Dealers quote for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered.....	\$29.00 to \$30.00
No. 1 foundry cast.....	27.00 to 28.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	36.00 to 37.00
Hydraulic compressed sheet scrap.....	24.00 to 25.00
Bundled sheet scrap, sides and ends, f.o.b. consumer's mill, Pittsburgh district.....	22.00 to 23.00
Bundled sheet stamping scrap.....	20.00 to 22.00
No. 1 railroad malleable stock.....	26.00 to 27.00
Railroad grate bars.....	18.00 to 19.00
Low phosphorus melting stock.....	39.00 to 40.00
Iron car axles.....	42.00 to 43.00
Steel car axles.....	43.00 to 44.00
Locomotive axles, steel.....	50.00 to 51.00
No. 1 busheling scrap.....	24.00 to 25.00
Machine shop turnings.....	18.00 to 19.00
Cast-iron wheels.....	32.00 to 33.00
Rolled steel wheels.....	34.00 to 35.00
*Sheet bar crop ends.....	34.00 to 35.00
Cast-iron borings.....	18.00 to 19.00
No. 1 railroad wrought scrap.....	35.00 to 36.00
Heavy steel axle turnings.....	23.00 to 24.00
Heavy breakable cast scrap.....	24.00 to 25.00

*Shipping point.

Chicago

CHICAGO, Dec. 3.

While miscellaneous inquiry is active, actual orders for finished steel products, from both the Government and private sources, have been lighter, as was to be expected after the heavy Government requirements booked last week. Meanwhile, specifications are good. November proved to be a more productive month with some of the mills than was October. Consumers probably will be forced to proceed in a hand-to-mouth manner, so far as their steel supplies are concerned, for some time, in view of Government absorption, the scarcity of cars and the tendency of the mills to avoid committing themselves too far ahead. Producers are faced with uncertainty as to how far their capacities will be taken by Government needs, and they wish to avoid commitments which they may not be able to meet, it being considered not improbable that demand in some directions may be so great that output in other directions will be curtailed. In the week, the Union Pacific placed 3500 cars, and fabricating jobs involving 2000, 1138, 250 and 175 tons were placed, the largest amount being for a theater in Chicago, to be supplied by an Eastern mill. Bolts and nuts are extremely active. The leading independent has sold its full quota of sheets for the first quarter. Pig iron has been lively, especially for malleable and high silicon iron, basic also being in demand, and altogether the probability of a shortage is looming up bigger. It is predicted that practically every foundry will soon be engaged on war work. Inactivity in some trades may somewhat ease the iron situation, the makers of sanitary products and cast-iron pipe not having much business in sight. Old material is firm, and there is an apparent scarcity. The earnings of brokers are being restricted to a degree which has suggested that they be paid by the consumers on a commission basis. There also is talk of extending fixed prices to all grades of scrap, instead of confining them to the four items now affected. Coke continues extremely hard to obtain.

Ferroalloys.—Sales of 80 per cent ferromanganese have been made at \$250, and this is regarded as the minimum. Inquiries are fairly numerous. Bessemer ferrosilicon is hard to find, but, if sold, would take the Government prices: \$55 for 10 per cent; \$58.50 for 11 per cent and \$61.60 for 12 per cent, all furnace.

Pig Iron.—Inquiry is heavy and buying has been active for all grades, although that part of the demand which calls for malleable and high silicon iron is the heaviest. Production is proceeding at a good rate, but there is growing uneasiness as to whether there will be sufficient iron to go round, despite the fact that production will be augmented by at least one new furnace in this district early next year. Work on furnace No. 5 of the Iroquois Iron Co. is progressing favorably, and it is expected to be in operation in the early part of 1918. Some relief may come from the falling off in demand for sanitary products and cast-iron pipe, which already is being experienced by their makers. On the other hand, it is predicted that as soon as foundries complete their present contracts they will be filled with Government work, one such requirement, immense in itself, being the castings which will be required for engines and other parts of the steamships which the Government is now building or has planned to build. Iron for this year is exceedingly difficult to find, unless the buyer will accept low silicones. The scarcity of standard analysis grades is causing melters to pay more attention to mixing with a view of utilizing the grades which are offered. The silveries are well nigh unobtainable from either the Ohio or Tennessee makers, most of whom are unwilling to sell further into next year, the former because of uncertainties of production. Basic is extremely scarce also. An illustration of the degree to which the market belongs to the sellers, in all save price, lies in the fact that one seller of southern iron cannot accept an order for more than 1000 tons without submitting the business to his principal. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, mal-

leable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	15.50
Lake Superior charcoal, No. 6 and Scotch.....	10.00
Northern coke foundry, No. 1.....	22.50
Northern coke foundry, No. 2.....	22.00
Northern coke foundry, No. 3.....	22.50
Northern high-phosphorus foundry.....	22.00
Southern coke No. 1 foundry and 1 soft.....	22.50
Southern coke No. 2 foundry.....	22.00
Malleable Bessemer.....	22.00
Basic.....	22.00
Low-phosphorus (copper free).....	22.00
Silvery, 7 per cent.....	22.50

Plates.—Since placing the large orders of a week ago, the Government has not been so conspicuous as a buyer. While plates can be had at 3.25c., Pittsburgh, or 3.465c., Chicago, most of the mills have none to offer for industrial consumption. There is a disposition to reserve everything for the Government, the indications being that it will need even more than was estimated. An Ohio mill is running practically 100 per cent on Government orders.

For material out of warehouse the quotation is 4.45c.

Bars.—Inquiry for mild steel bars is fairly lively, and sales are being made from time to time on the basis of 2.90c., Pittsburgh, or 3.115c., Chicago. Rail carbon bars have been a little more active, sales having been made around 3.25c., Chicago. The makers are awaiting the fixing of an official price, the discussion of which has been going on for several weeks. In bar iron, at 3.50c., Chicago, there has been some business, but not a great deal.

We quote warehouse prices for Chicago delivery as follows: Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c.; base, with 5c. extra for twisting sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Structural Material.—Not much change is to be noted in structural shapes, although in the week two fairly good contracts were awarded, one for 2000 tons and another for 1138 tons. Contrary to expectations, a theater project has progressed to the letting point, although the steel was cut down a few hundred tons. The Union Pacific has placed 3500 cars, of which the Cambria Steel Co. got 1000 gondolas, the Pullman Co. 1000 hoppers, the American Car & Foundry Co. 1000 stock-cars and the Bettendorf Co. 500 flat cars. The same company has 50 cabooses and 200 oil tank cars, but its inquiry for 1000 logging trucks has been cancelled. The Illinois Central is inquiring for 1000 hoppers and 300 flat cars, and there also is under inquiry 2000 cars for South America, presumably for Chile. Armour & Co. will build 500 refrigerator cars, which are largely of wood, in its own shops. From Eastern sources shapes can be had at 3c., Pittsburgh, or 3.215c., Chicago. For material out of warehouse, jobbers quote 4.20c.

The following lettings are announced:

Columbia Steel Co., extension to present plant, Pittsburgh, Cal., 250 tons, to Pacific Rolling Mill Co.

Western Vaudeville Association, State and Lake Theatre Building, Chicago, 2000 tons, to Bethlehem Steel Co.

Great Northern Railway Co., renewal of inner 160 pockets Ore Dock No. 3, Alloway, Wis., 1138 tons, to American Bridge Co.

Utah Copper Co., structural steel for new rigger shed, Magna, Utah, 175 tons, to Kansas City Structural Steel Co.

Sheets.—So heavy has been the demand for sheets that the leading independent has booked orders to the limit of its capacity over the first quarter of next year. Beyond March it is not selling, finding it preferable to keep within that period in preparation for any change in Government attitude or demands. Another producer has no black or galvanized to offer, but can commit itself further on blue annealed. Despite the situation, there is still a goodly volume of unsatisfied inquiry. Government mill prices follow: No. 28 black, 5c.; No. 10 blue annealed, 4.25c., and No. 28 galvanized, 6.25c., all Pittsburgh.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c.; and No. 28 galvanized, 7.70c.

Cast-Iron Pipe.—Winnipeg, Man., has postponed until Dec. 14 the taking of bids on 4500 tons, this being the second postponement. Jackson, Mich., has taken

bids on 167 tons, but has made no award. The market is quiet and prices without change.

Quotations per net ton, Chicago, are as follows: Water pipe, 4 in., \$58.50; 6-in. and larger, \$55.50, with \$1 extra for Class A water pipe and gas pipe.

Wire Products.—That specifications are good comprises the report on wire. We quote as follows, per 100 lb. to jobbers:

Nails, \$3.50, Pittsburgh; plain fence wire, \$3.25; painted barb wire, \$3.65; galvanized barb wire, \$4.35; polished staples, \$3.65, and galvanized staples, \$4.35.

Rails and Track Supplies.—Light rails are in active demand and in limited quantities available at the recently fixed Government prices, the base being 3c. per lb. for 25 to 45-lb. in carload lots. We quote:

Standard railroad spikes, 4.50c. to 5c., base; small spikes, 4.75c. to 5.50c., base; track bolts with square nuts, 5.50c. to 6c., all in carloads, Chicago; tie plates, \$70 to \$80 f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$88 base (nominal); open hearth, \$40 (nominal). For prices of light rails see finished iron and steel, Pittsburgh report.

Old Material.—There is some buying from day to day, but the volume cannot be called large, partly because there is no great amount of scrap to sell and further because, with the prices of the leading items fixed, there is no need for precipitate action. Steps have been taken to fix prices for every grade of scrap, also to have the brokers placed on a commission basis, whereby they would receive a fixed amount per ton from the mills for the transactions they negotiate. It is argued that the consumers look to the brokers and dealers for material, and if, in consequence, the brokers take care of their customers, it is right that they should be compensated. Yet on a number of items they are likely to be asked to pay the full Government price—all that they can charge their customer. This is true of No. 1 railroad wrought, for which the railroads are getting \$31.25, per net ton on track. This is equal to \$35, gross ton, the maximum price which the Government fixed. It follows that the brokers cannot pay \$31.25 and, in turn, sell it to the mills for that amount. A commission from the consumers would rectify this situation and supply the incentive for the broker to perform his function—locate material and arrange for its transfer. Under present condition, there is no motive for speculation on the part of the broker and there would be none under the commission arrangement. The Pennsylvania Lines West and the Lake Erie both have extensive lists before the trade. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	\$37.00 to \$38.00
Relaying rails	50.00 to 55.00
Old carwheels	30.00 to 31.00
Old steel rails, rerolling	35.00 to 36.00
Old steel rails, less than 3 ft.	33.50 to 34.50
Heavy melting steel scrap	28.00 to 29.00
Frogs, switches and guards, cut apart	28.00 to 29.00
Shoveling steel	27.00 to 28.00
Steel axle turnings	23.00 to 24.00

Per Net Ton

Iron angles and splice bars	\$36.50 to \$37.50
Iron arch bars and transoms	37.50 to 38.50
Steel angle bars	26.00 to 27.00
Iron car axles	45.00 to 46.00
Steel car axles	41.00 to 42.00
No. 1 railroad wrought	31.25 to 32.25
No. 2 railroad wrought	29.00 to 30.00
Cut forge	28.50 to 29.00
Pipes and flues	22.00 to 23.00
No. 1 busheling	24.00 to 25.00
No. 2 busheling	17.50 to 18.00
Steel knuckles and couplers	32.00 to 33.00
Coil springs	38.00 to 39.00
No. 1 boilers, cut to sheets and rings	19.00 to 20.00
Boiler punchings	31.50 to 32.50
Locomotive tires, smooth	33.00 to 34.00
Machine-shop turnings	16.50 to 17.50
Cast borings	16.50 to 17.00
No. 1 cast scrap	23.50 to 24.50
Stove plate and light cast scrap	19.00 to 20.00
Grate bars	19.00 to 20.00
Brake shoes	19.50 to 21.00
Railroad malleable	27.00 to 28.00
Agricultural malleable	23.25 to 24.25
Country mixed scrap	18.00 to 19.00

Bolts and Nuts.—Inquiry is piling in on the makers whose greatest problem now is finding material wherever to manufacture their product. Some of the current orders come from firms having Government con-

tracts and therefore must have precedence. One large manufacturer has revised all contracts on his books, making them conform with the recently announced Government prices. No change has been made in the price of lots out of store. For prices and freight rates see finished iron and steel, Pittsburgh, page 1391.

Store prices are as follows: Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to $\frac{3}{8}$ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to $\frac{3}{8}$ x 6 in., 40-2 $\frac{1}{2}$; larger sizes, 30-5; hot pressed nuts, square, \$2, and hexagon \$2 off per 100 lb.; lag screws, 50 per cent off.

Philadelphia

PHILADELPHIA, Dec. 4.

The railroad congestion is the most trying situation the iron and steel industry has faced in many years. There is no perceptible relief as yet in the coal and coke shortage and many open-hearth furnaces in this district are out because of lack of sufficient supplies of gas coal, while blast furnaces are making a poor record of production through lack of coke. It seems as if all of the troubles which handicap the production of iron and steel are directly traceable to the inability of the transportation systems to cope with present heavy shipments. Effective and permanent relief seems out of the question as long as the present inadequate supply of locomotives and cars, complicated by labor shortage and a confusion of priority shipments, continues. Despite efforts of the Government to facilitate the movement of freight by various measures, the congestion threatens to last throughout the winter, and will surely become more serious when winter snows fall, in spite of anything that can be done. It is certain that manufacturing consumers who are not engaged on war work will suffer the greatest from lack of coal, coke and pig iron. Shortage of pig iron grows more serious and will become a factor to be reckoned with during the next few months. It is becoming impossible to ship pig iron on some of the railroads except to war contractors, and some sellers of iron now decline to enter into contracts with consumers who cannot produce a Government order number. Moreover, there is a tightening of the shipping regulations so that it is not so easy for companies furnishing Government order numbers to obtain iron. Railroads which carry iron from the Virginia furnaces have found that a general embargo against all but shipments for Government work has not proved effective in curtailing shipments; so now every shipment of pig iron must be consigned to an officer of the United States Government or the bill of lading must be accompanied by a special envelope giving information to the railroad as to the character of the war work the consignee is doing and the amount of iron required. The effect of this will probably be to prevent consumers from obtaining shipments of iron larger than the quantity actually required for the Government work. Present conditions point unmistakably to the fact that many foundries will find themselves in a serious predicament when their present stocks of iron are gone. Unless they are very largely on Government work, they will not be able to get iron, and undoubtedly many will be obliged to suspend operations. A general embargo has been issued by the railroads against shipment of pig iron and all steel products to seaboard for export. This embargo is a sweeping one and until lifted will cut off all export shipments. Exceptions are to be made to this in the case of our Allies when ships are available to move the present accumulation of freight at seaboard. The Pennsylvania Railroad has declared an embargo on Philadelphia and all eastbound shipments from Pittsburgh and other points West must be routed so as to avoid Philadelphia. Congestion of freight in this city is so serious that shipments cannot be made from one end of the city to the other, and this works a particular hardship in the case of iron and steel scrap.

Pig Iron.—Present conditions point to an alarming shortage of pig iron for next year. The demand for basic iron is large and insistent. There are many inquiries in the market for the first half of 1918 which cannot be satisfied. In a few instances, steel mills have contracted for Bessemer iron at \$36.30, furnace, to

take the place of their basic requirements. Practically all furnaces are sold up for the first quarter and many have no iron to sell for the first half. Selling is now general for the third quarter and at the present rate of contracting it will not be long before the entire furnace production for 1918 will have been contracted for, if the furnaces are willing to make commitments that far ahead. Although the demand for basic iron is the largest, there is also considerable demand for low phosphorus iron, one inquiry calling for 15,000 tons for first half. Inquiries for foundry iron are also numerous and make a large aggregate. Some sellers decline to quote even to good customers who cannot assure the seller that they will be able to produce Government order numbers before time of shipment. It is the opinion of a majority in the trade that it will soon be impossible for iron consumers who are not on war work to obtain shipments, even if they have iron under contract. With a scarcity of all grades of iron and many war contractors clamoring for supplies, it is certain that after the war requirements are satisfied, there will be little or no iron left for those not engaged on war work. Practically all of the steel makers are so heavily engaged in manufacturing for the Government that their wants will be taken care of so far as possible, but many foundries are utilizing only a minor part of their capacity for war work and they will not long be able to obtain a supply sufficient to provide for non-government work along with their war work. Obviously, a foundry which is engaged only 10 or 20 per cent on war work cannot continue to operate without loss unless it can obtain sufficient iron to provide for other work as well. Instances are cited of foundries having war orders for, say, 25 tons of castings which have obtained 200 or 300 tons of pig iron, using the surplus on private work. Restrictions on shipping point clearly to the conclusion that this practice will not be possible much longer. Virginia railroads have not succeeded in materially curtailing shipments of iron by declaring a general embargo against all but Government orders, so have tightened shipping restrictions by requiring the furnace to consign the iron to an officer of the United States Government or to file with the bill of lading a special envelope containing specific information as to the shipment. The effect of this new order will be to prevent so-called non-essential industries from obtaining iron and to curtail shipments even to essential industries to actual requirements for Government work. One of the large inquiries for foundry iron in the market is from a radiator company, which wants 12,000 tons throughout 1918. A sales office here is offering a fair tonnage of washed metal for delivery during the first half. Washed metal is being successfully used in some instances as a substitute for low phosphorus pig iron. It analyzes 0.025 in phosphorus, 0.025 in sulphur and contains no silicon, manganese or copper. The price is based on the fixed price for low phosphorus iron, but is considerably higher. A question has arisen between buyers and sellers in a few instances as to whether there should be a premium for reductions in the sulphur content of low phosphorus iron below 0.04, the point fixed for the \$53 grade. Provision was made for the addition of \$1.50 for each 0.005 reduction in phosphorus below 0.04, but nothing was said as to sulphur in the price agreement. In one instance, the matter has been submitted to authorities in Washington for adjustment. We quote standard grades of pig iron as follows at furnace, to which should be added the freight to destination:

Eastern Pennsylvania No. 1 X.....	\$34.50
Eastern Pennsylvania No. 2 X.....	33.50
Eastern Pennsylvania No. 2 foundry.....	33.00
Virginia No. 2 X.....	33.50
Virginia No. 2 foundry.....	33.00
Basic.....	33.00
Gray forge.....	32.00
Bessemer.....	36.30
Standard low phosphorus.....	53.00
Low phosphorus (copper bearing).....	50.00

Coke.—Scarcity of coke continues one of the most serious factors in production of pig iron. Foundries are also suffering severely and their melt has been considerably reduced because of inability to obtain coke as

needed. Foundries which are on war work have in many instances used more coke than they expected to, and the deliveries on contracts do not satisfy their requirements. Hence they are continually short and are asking the producers to anticipate deliveries. We quote blast furnace coke at \$6, ovens, and 72-hr. foundry coke at \$7, ovens, with none for prompt delivery to be had.

Ferroalloys.—Ferromanganese shows weakness, now being quoted at from \$235 to \$245. The business done is principally in carload lots. Spiegeleisen is also slightly weaker and \$60, furnace, can now generally be done for any delivery. Notwithstanding the belief of producers of ferromanganese that imports of manganese ore are likely to fall short of requirements, and thereby cause a shortage later on of ferromanganese, buyers do not seem to be in any hurry to place contracts for forward delivery. Some fairly large contracts have been placed, but there are many steel mills which have not covered for next year.

Semi-Finished Material.—There would be a tremendous demand for billets and slabs if there appeared any likelihood of mills being willing to accept contracts for next year. The steel mills of eastern Pennsylvania will require all of the billets and slabs they will produce for their own finishing mills, and it seems unlikely that any large quantities will be offered in this market for some time. A fair tonnage of Bessemer rerolling billets, which an eastern Pennsylvania mill had to offer for prompt delivery, was quickly taken and no more orders will be accepted in the immediate future. This mill had a part of its Bessemer steel capacity available for the next few months and has accepted contracts for sheet bars aggregating about 25,000 tons, deliveries to be spread equally over the next three months.

Sheets.—Contracting for first quarter continues fairly active, especially in blue annealed sheets. A peculiar situation exists with regard to warehouse prices on sheets. Although the prices agreed upon with the Government permit the jobbers to charge 5.435c., Philadelphia, for No. 10 blue annealed, which is mill cost and freight, plus a profit of 1c. per pound, they have not in a great many instances been able to obtain this price because the sheet mills have had fair-sized lots to offer from their stock sheets, and the mills charge only 50c. per 100 lb. above the mill base price for less than carload shipments. As a result, the warehouses have frequently been selling blue annealed sheets at the mill price, 4.25c., Pittsburgh, and their only profit has been the cash discount, which the mills give them for cash within 10 days. We quote No. 10 blue annealed, 4.25c., Pittsburgh; No. 28 black at 5c. and No. 28 galvanized at 5.25c.

Finished Iron and Steel.—Inquiry for structural material for building purposes, except for the Government, has fallen off practically to nothing. Railroad congestion is no doubt a contributing factor, buyers realizing that if they were able to place orders for non-Government work they might not be able to obtain satisfactory deliveries owing to the already overcrowded condition of the freight transportation systems, and the disposition of railroads to accept nothing but material essential for war purposes. The Bethlehem Steel Co. will establish a warehouse and will sell shapes, plates and other finished steel at the recognized warehouse prices. Rollers of shapes are receiving large specifications from the Emergency Fleet Corporation, principally for shipment to fabricators which are doing work for the American International Shipbuilding Corporation and the Submarine Boat Corporation. Some of the material is being shipped to points as far distant as Minneapolis, Minn., and Canada, there to be fabricated into sections and returned to the shipyard at Hog Island. It has doubtless been necessary for the American International Shipbuilding Corporation to utilize all of the available fabricating plants in the country, regardless of location, to complete their gigantic shipbuilding program, but steel mills look upon the long haul and back haul of this material as something which, if possible, should have been avoided in view of present transportation difficulties. The Submarine Boat Corporation, which was the first to place its contracts with fabricators, is said to have obtained the services of practi-

ally all of the Eastern fabricating plants, leaving the American International Shipbuilding Corporation no alternative but to go farther West. The situation on plates is, of course, the same. About 200,000 tons of plates and shapes will be required for the second lot of 70 ships to be built at Hog Island. Bids for fabricated work are now being taken. The decision of the War Industries Board to make Chicago a basing point continues to disturb Eastern steel producers, and it is apparent that, except on Government order, steel will not be sold under existing conditions for delivery west of Pittsburgh. If a Western consumer is not able to place his orders with mills in Pittsburgh or west, he will probably be obliged to do without steel, unless he has a war contract and can obtain deliveries through the Government. Fewer plates are now being sold. One company, which has been taking orders for the past two months, is now practically out of the market, the Government having given it orders which will take a large part of its capacity. The same is true of another plate mill, which recently sold a number of small tonnages of universal plates. When the Government authorities learned that its universal mill was available, orders for Government work were forthcoming, and this company has also withdrawn from the market. Shipments of shapes and plates are very largely for Government work. A shape mill in this district shipped fully 50 per cent during November for Government work, and expects that in January and February this will be increased to 75 per cent. A plate mill last week shipped its entire output on Government order, and it expects to continue doing this for several weeks, at least. The new plate mill of the Lukens Steel Co., Coatesville, Pa., will be in operation in February and will greatly increase this company's output. The situation as to steel bars is virtually unchanged. An Eastern mill will soon accept contracts from its regular customers for first quarter delivery of plates, shapes and bars at the Government prices. Finishing mills have been able to make a fair rate of production during November by utilizing stocks of cold ingots. Ingot production has been decreased probably 25 per cent in some plants by lack of sufficient gas coal for open-hearth furnaces. A few of the largest steel companies, which are self-contained in coal and coke supply, have made a record rate of production in November, but this condition is not general. We quote shapes at 3c., plates at 3.25c. and steel bars at 2.90c., Pittsburgh.

Bar Iron.—Contracts for first quarter delivery are now being taken at the new fixed price, which is generally quoted as 3.50c., Pittsburgh base, for Eastern delivery, and 3.50c., f.o.b. mill, for Western delivery. This makes the delivered price in Philadelphia and vicinity 3.685c. Some of the bar iron mills in eastern Pennsylvania are operating at greatly reduced capacity, and one plant is closed down entirely owing to shortage of raw materials.

Rails.—An Eastern mill has received a Government order for 5000 tons of standard Bessemer rails for shipment to France.

Wire Nails.—The American International Shipbuilding Corporation has placed an order for 20,000 kegs of wire nails at 3.25c., Pittsburgh.

Steel Tubes.—An eastern Pennsylvania steel mill has available capacity for making prompt deliveries of lapwelded steel tubes in practically all sizes at the agreed prices.

Old Material.—A scarcity of iron and steel scrap is developing from the fact that the small dealers throughout the country do not seem to understand the import of fixed prices and are accumulating stocks in the belief that higher prices will be obtainable later. If there is any change in scrap prices by the Government, it is more likely to be downward than upward. Jobbers have in many instances tried vainly to persuade the small dealers to sell. Under normal conditions, higher prices usually follow heavy snowstorms because of congestion on railroads caused thereby. The small dealers think that such will be the case this year, and it has been difficult to educate them to see that prices cannot go higher without the consent of the Government. Such mis-

information does not extend exclusively to the small dealer, however. A jobber here cites the case of a large producer who did not know until told a few days ago that any scrap prices had been fixed by Government order. Pittsburgh steel mills have largely satisfied their requirements for melting steel, but fair tonnages continue to be placed on the basis of \$30, Pittsburgh, while sales for delivery in eastern Pennsylvania are generally about \$27. There have been a few violations of the fixed price schedule, and it is probable that an announcement will be made soon that will clarify the fixed price arrangement and make trading less difficult. We quote as follows for delivery in eastern Pennsylvania:

No. 1 heavy melting steel.....	\$27.00 to \$28.00
Steel rails, rerolling.....	38.00 to 40.00
Low phosphorus heavy melting.....	36.00 to 38.00
Old iron rails.....	38.00 to 40.00
Old carwheels	34.00 to 36.00
No. 1 railroad wrought.....	35.00
No. 1 yard wrought.....	32.00 to 34.00
No. 1 forge fire.....	22.00 to 23.00
Bundled sheets	22.00 to 23.00
No. 2 busheling.....	15.50 to 16.50
Steel turnings (for blast furnace use).....	15.50 to 16.00
Machine shop turnings (for rolling mill use)	18.00 to 19.00
Cast borings (for blast furnace use).....	15.50 to 16.00
Cast borings (clean).....	20.00
No. 1 cast.....	31.00 to 33.00
Grate bars	21.50 to 22.50
Stove plate	22.00 to 23.00
Railroad malleable.....	30.00 to 32.00
Wrought iron and soft steel pipes and tubes (new specifications).....	30.00 to 32.50

Buffalo

BUFFALO, Dec. 3.

Pig Iron.—Inquiry is of large proportions for foundry, malleable and basic, but particularly for foundry grades, far in excess of ability of furnaces to supply, and few sales are made in comparison to the number of inquiries received. In many instances, furnaces have been obliged to decline to accept orders for deliveries desired by buyers late next year, as they are sold up for at least through the third quarter of 1918 and many uncertainties are connected with later delivery. A considerable portion of the inquiries received are for steel making iron for munitions and other war order work. We continue to quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry.....	\$34.50
No. 2 X.....	33.50
No. 3 foundry.....	32.50
Gray forge	32.00
Malleable	33.50
Basic	33.00
Lake Superior charcoal, f.o.b. Buffalo.....	39.75

Finished Iron and Steel.—There has been greater inquiry during the week for nearly all classes of finished products than for a considerable period recently, the larger portion representing material required in connection with Government contracts; although considerable inquiry developed for special bar material for regular consumption. Wire rod inquiries also are before the market from Canadian sources, and plate orders are seeking placement from the same market. Billets for export are in strong demand and good-sized tonnages are going forward to Italy and France on recent orders. Manufacturers of bolts, nuts and rivets, and sales agencies for same, state that the Government price for these commodities fixed recently by the bolt and nut division of the American Iron and Steel Institute by request of the War Industries Board is having the effect of bringing out increased specifications, for the reason that purchasers now know what to expect in the way of definite prices and more business is developing.

Old Material.—Demand is exceedingly active from both local and outside sources and prices are extremely strong and firmly held, due to a large extent to the scarcity of many of the listed commodities. This scarcity is caused very largely by inability of dealers to get materials in yards properly classified on account of the great difficulty in securing sufficient labor for sorting and also on account of scarcity of cars for loading. The price is held very firmly at the maximum allowed by law—\$30. There is a strong demand for

low phosphorus at \$40 per ton; also for No. 1 railroad wrought, and prices have advanced on a number of commodities. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel.....	\$29.00 to \$30.00
Low phosphorus	40.00 to 42.00
No. 1 railroad wrought	34.00 to 35.00
No. 1 railroad and machinery cast.....	30.00 to 31.00
Iron axles	45.00
Steel axles	45.00
Carwheels	32.00 to 33.00
Railroad malleable	29.00 to 30.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	26.00 to 27.00
Clean cast borings	19.00 to 20.00
Iron rails	37.00 to 38.00
Locomotive grate bars	20.00 to 21.00
Stove plate	21.00 to 22.00
Wrought pipe	26.00 to 27.00
No. 1 busheling scrap	26.00 to 27.00
No. 2 busheling scrap	17.00 to 18.00
Bundled sheet stamping scrap.....	19.00 to 20.00

Cincinnati

CINCINNATI, Dec. 4.—(By Wire.)

Coincident with the increasing shortage of steel making irons, there is a rapidly growing demand for them. The inquiry for basic is not only from nearby consumers but Eastern mills are also trying to locate a future supply. The southern Ohio melter whose inquiry for 10,000 tons was mentioned last week has not yet been able to place the order for the iron wanted. Malleable is also very scarce, but the demand for it is not quite so urgent. The South continues to be the main source of supply for foundry iron and while inquiries are light, numerous small sales have been made both locally and through southern Ohio and Indiana. All of this iron is wanted for shipment in the first half of next year. Virginia foundry iron has almost ceased to be a factor in this market with the exception of a few odd lots that are offered from time to time and readily sold. Hanging Rock furnaces are so far behind in shipments on former contracts that they are unwilling to take any further future business. A curtailment in the production of Ohio silvery iron has added to the scarcity of high silicon iron and only occasional car loads have been available for sale lately. The insufficient furnace coke supply has almost reached the danger line. Based on freight rate of \$2.90 Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, for 1917 shipment, prices as follows:

Southern coke, No. 2 foundry and 2 soft.....	\$35.90
Southern Ohio coke, No. 2.....	34.26
Basic, Northern	34.26

Finished Material.—With no exceptions, the jobbers report business as being quieter. At the same time, the demand for reinforcing concrete bars is much better than usual at this season of the year. Contractors at Dayton, Ohio, have drawn from local stocks to complete additions to plants now under way, and while the orders sent are not for any large-sized tonnage, the total makes a very fair showing. Wire nails are held at higher figures by wholesale houses and shipments from stock are not now made under \$4.10 per keg base, and \$4.20 is the asking price. In spite of the numerous embargoes, shipments from the mills are coming through in time to replenish stocks of nearly all kinds of finished material. The mill price of No. 28 black sheets is 5.18½c., and No. 28 galvanized 6.43½c. f.o.b. Cincinnati or Newport, Ky. We quote store prices as follows: Plain iron and steel bars, 4.08c.; twisted steel bars, ¾ x 1¼-in., 4.23c.; ½-in., 4.33c.; ½-in., 4.43c.; ¾-in., 4.63c., and 1¼-in., 4.88c. Structural shapes, 4.18c.; plates ¼-in. and heavier, 4.43c.; cold rolled shafting 10 per cent discount from list, and No. 10 blue annealed sheets 5.45c.

Coke.—Both Connellsburg and Wise County operators are taking on some foundry coke contracts at the Government price of \$7 per net ton at oven. However, contracting has been somewhat lighter due to the inability of the producers to look very far ahead on account of the uncertain coal supply. Complaints are more frequent as to delayed shipments from all districts due to the car shortage situation that is now a more serious reality. Furnace coke cannot be had for either prompt or forward shipment, as the producers have all they can do to take care of their old contracts.

Both New River and Pocahontas operators are still out of the market with exceptional small lots of foundry coke that can be disposed of, most of which is for nearby shipment.

Old Material.—Price conditions are unchanged with a probable tendency toward lower figures on prompt shipment material. It is still a very difficult matter to send forward shipments intended for the larger consumers in the Pittsburgh district, and there is no indication that this situation will improve at any early date. Cast scrap is probably firmer than wrought scrap, but this is looked on as a temporary condition. The following are dealers' prices f.o.b. cars, southern Ohio and Cincinnati.

	Per Gross Ton
Bundled sheet scrap.....	\$17.50 to \$18.00
Old iron rails	32.00 to 32.50
Relaying rails, 50 lb. and up.....	44.00 to 44.50
Rerolling steel rails.....	33.00 to 33.50
Heavy melting steel scrap	25.00 to 25.50
Steel rails for melting	24.50 to 25.00
Old carwheels	27.00 to 27.50

	Per Net Ton
No. 1 railroad wrought	\$29.00 to \$29.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	18.50 to 19.00
No. 1 machinery cast	24.50 to 25.00
Burnt scrap	13.00 to 13.50
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pipes and flues	15.50 to 16.00
Malleable cast	19.50 to 20.00
Railroad tank and sheet	14.50 to 15.00

Birmingham

BIRMINGHAM, ALA., Dec. 3.

Southern pig iron manufacturers are selling their product right along, mainly to regular customers, but in small lots, not having a very large amount of the probable make for the first half of the coming year left. There is no inclination in this section to sell beyond July 1, though there have been a few thousand tons disposed of covering the entire year. Inquiries are numerous, and even districts that have furnaces of their own are making inquiry as to the earliest time iron can be shipped, offering to pay the freight rates in addition to get the iron. Production and delivery are being given all attention in this section, the sales being accomplished without effort. The Republic Iron & Steel Co. has shut down two of its Thomas blast furnaces here as result of fire destroying the tipple and coal washer of the Sayreton mines last week, reducing the coke supply. Iron production is reduced not less than 500 tons daily. Sales in small lots are beginning to aggregate fair tonnage.

Shipments of pig iron show a little improvement recently, but old contracts in hand for iron can hardly be cleared off until the middle of summer. All sales now are f.o.b. furnaces, \$33 per ton, No. 2 foundry, even home consumers not being given concession. Prominent iron men of the South visited other sections recently and found that demands for iron were such that there were no reasons for fears as to future production being too great. Some of the larger consumers who placed orders the first of the year and are behind in getting what is due them still have representatives in Birmingham trying to get the iron out. Confidence is expressed that the iron market in the South will be strong all through the coming year.

Coal and Coke.—Coal production in the South is greater now than it ever was, but the demand has increased to such an extent that there is just as much shortage as ever before. Federal control, nationally and locally, is in effect, even to the retailing of the product, yards dealing out fuel by the ton and within sight almost of the mines being without stock. Contentions are on between operators and union miners, but expectations are that there will be arbitration of some kind, and not a dark spot is to be noted on the horizon. A conference will be held between the two interests and the National Fuel Administrator, Dr. H. A. Garfield, in Washington next Thursday. Coke production is good in this section, but none too much. Small lot sales are being made at \$7 per ton, foundry coke, and \$6 for furnace. Contracts made some time ago at higher prices are on the wane.

Old Material.—The scrap iron and steel market in the South is stronger. There is scarcity of old material, and difficulty is being experienced in getting cars with which to make shipments. Many inquiries for scrap have been received recently, but embargoes in the East prevent any of the business being accepted. The Government schedule of prices on scrap iron and steel has not yet been reached in the South. Some few changes were made in the quotations for the week. Scrap prices follow:

Old steel axles.....	\$32.00 to \$33.00
Old steel rails.....	26.00 to 28.00
Heavy melting steel.....	22.50 to 25.00
No. 1 wrought.....	26.00 to 28.00
No. 1 cast.....	22.50 to 25.00
Stove plate.....	17.50 to 18.00
Old car wheels.....	25.00 to 30.00
Tramcar wheels.....	20.00 to 25.00
Machine shop turnings.....	17.00 to 18.00
Cast iron borings.....	13.00 to 15.00

British Steel Market

Pig Iron Quotations Higher—Ferromanganese at \$270 for American Trade

(By Cable)

LONDON, ENGLAND, Dec. 5.

Cleveland pig iron makers are now asking 95s. for the home trade and 116s. 6d., f.o.b., for the Allies, subject to official sanction. American semi-finished steel is idle. Tin plates are quiet at 31s. 3d., including tin allowance. Ferromanganese is nominal, with sellers asking \$270, c.i.f., for forward shipment to North Atlantic ports. We quote as follows:

Tin plates, coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s. 3d.

Ferromanganese, \$270 c.i.f. nominal for export to America.

Ferrosilicon, 50 per cent, c.i.f., £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, p. 171.

St. Louis

ST. LOUIS, Dec. 3.

Pig Iron.—The call for pig iron continues incessantly with no improvement in the prospect of supplying those in need of the metal. Inquiries still pending in the market include a heavy tonnage of foundry iron, running probably to an aggregate of 20,000, while three large consumers of basic are in the market for an aggregate of about 50,000 tons for first half delivery, but are unable to place the contracts. Both Northern and Southern basic are wanted and the quantities of each depend upon the ability to place the orders, although ordinarily the inquirers would take about half of each. In malleable there is an inquiry still out for 1500 to 3000 tons for third quarter delivery, but it also remains unplaced. Sales during the week aggregated about 4000 tons for all deliveries accepted with the individual tonnages running from 500 tons down.

Coke.—The buying of coke during the past week has been as heavy as the capacity of the ovens represented here would permit, which means that the aggregate of sales was much lower than it would otherwise have been. A considerable number of sales were made, probably 5000 tons in the aggregate. Inquiries for probably ten thousand tons ranging from 1000 ton lots downward are still unfilled.

Finished Iron and Steel.—Practically no material is available and consumers with contracts are getting delayed deliveries. Movement out of warehouse continues up to the capacity of the warehouses to fill, but the prices are being maintained at the Government figures. We quote for stock out of warehouse as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material.—In the scrap market the dealers and others have still further readjusted themselves to the Government prices, but because only so few of the items have been listed there is still a great deal of uncertainty which is leading to a decided disinclination to buy, sell or speculate. The consuming interests are also keeping

out of the market either because they are expecting lower prices or for some other reason and in consequence very few transactions are being recorded. A considerable quantity of relaying rails is reported coming on the market. In consequence, relayers are easier. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

	Per Gross Ton
Old iron rails.....	\$35.00 to \$35.50
Old steel rails, re-rolling.....	36.50 to 37.50
Old steel rails, less than 3 ft.....	37.00 to 37.50
Relaying rails, standard section, subject to inspection.....	60.00 to 75.00
Old car wheels.....	29.50 to 30.50
No. 1 railroad heavy melting steel scrap.....	27.50 to 28.50
Heavy shoveling steel.....	26.00 to 26.50
Ordinary shoveling steel.....	25.00 to 25.50
Frogs, switches and guards cut apart.....	28.00 to 28.50
Ordinary bundled sheet scrap.....	19.00 to 20.00
Heavy axle and tire turnings.....	19.00 to 19.50
	Per Net Ton
Iron angle bars.....	\$34.50 to \$35.00
Steel angle bars.....	27.00 to 27.50
Iron car axles.....	43.50 to 44.00
Steel car axles.....	41.00 to 41.50
Wrought arch bars and transoms.....	38.00 to 39.00
No. 1 railroad wrought.....	31.00 to 31.50
No. 2 railroad wrought.....	29.50 to 30.00
Railroad springs.....	32.50 to 33.00
Steel couplers and knuckles.....	29.50 to 30.00
Locomotive tires, 42 in. and over, smooth inside.....	31.50 to 32.00
No. 1 dealers' forge.....	21.75 to 22.75
Cast iron borings.....	17.00 to 18.00
No. 1 busheling.....	23.50 to 24.00
No. 1 boilers, cut to sheets and rings.....	20.00 to 20.50
No. 1 railroad cast scrap.....	23.50 to 24.00
Stove plate and light cast scrap.....	17.00 to 17.50
Railroad malleable.....	25.50 to 26.00
Agricultural malleable.....	21.50 to 22.00
Pipes and flues.....	21.00 to 21.50
Heavy railroad sheet and tank scrap.....	19.50 to 20.00
Railroad grate bars.....	18.00 to 18.50
Machine shop turnings.....	17.00 to 18.00
Country mixed scrap.....	18.50 to 19.00
Uncut mixed railroad scrap.....	21.00 to 21.50

San Francisco

SAN FRANCISCO, Nov. 27.

The fear of a strike of the shipbuilders has faded and the dominant feature of the local market is the Government control of the trade and the effect of the Government prices put in force Nov. 6. These have resulted in putting the iron and steel business on a war basis rather than a commercial basis. Outside of Government orders there is no big business in sight. The Pacific Coast Shipbuilding Co., of which Henry T. Scott, formerly of the Union Iron Works, is sponsor, has begun to erect its plant at Bay Point and will rush it to completion. It is stated that this new company has contracts from the Government to build ships valued at \$10,000,000. Machinery valued at about \$1,000,000 has already been ordered in the East, and through Government assistance it will have no difficulty in finding cars for bringing out this machinery. The Schwabacher Co. has already laid the keels for eight ships in its yards in South San Francisco, but these two plants, working as they do entirely on Government contracts, have no effect on the local commercial aspect of the trade. There is plenty of foreign demand, and large shipments could be made for the export trade. The embargo, however, is being rigidly enforced, and permits are impossible to obtain. In this connection, an unusual condition has arisen in scrap from Mexico, whence several good-sized shipments have arrived in bond for Japan. Other scrap from Mexico has been sold on this market at good prices. One shipment of more than 400 tons of steel scrap that once was a part of Mexican railroads reached this port a few days ago consigned to a local firm.

Bars.—The market for bars was the most sensitive to Government regulations and the first to reduce its price. This was mainly because the local mills roll bars but not the heavier shapes. The mills reduced their price at once to conform with Government regulations, and the jobbers reduced their price to about 5c. The jobbers' quotations are unstable, and a further reduction is looked for.

Structural Material.—Shapes followed bar in conforming with the Government prices. There is very little of this material on hand, and the demand is light except for Government purposes. What sales have been made have been about 5c.

Plates.—The price of plates both at the jobbers and at the mills show a marked reduction. From stock they are selling at about 5c., while the rolling mills are adhering strictly to Government prices.

Sheets.—Like bars and plates, sheets show a decided slump in the jobbing market, due to the Government regulations. No. 28 gage is quoted 1c. lower than before the Government prices went into effect. The prevailing price is 9.50c. compared with 10.50c. before Nov. 6.

Wrought Pipe.—There is a considerable demand for wrought pipe in the shipbuilding plants on the northwest, but otherwise the situation is quiet. The Government prices are prevailing. A considerable demand has developed among the jobbers in butt weld sizes, which are quoted at 4.50c. for the $\frac{1}{4}$ -in. size and 7.70c. for the $\frac{3}{4}$ -in.

Cast Iron Pipe.—An advanced charge is being made for cast iron pipe, and still higher prices are expected after the first of the year. These increases were made on account of the increased cost of labor and raw material, and they seem to have had the effect of stimulating the market. The new price, based on Class B or heavier, is \$50.

Pig Iron.—The Government price is approximately \$46 in San Francisco on a basis of No. 2 foundry. Most of the trade has contracts covering the first six months of next year. The furnaces are offering pig freely at the Government prices, but they are requiring all specifications where immediate shipments are requested. There is practically no future buying, and on account of the general car shortage deliveries are very hard to make. There is plenty of foreign demand, but the embargo prevents all business of this kind.

Coke.—All the local furnaces are well supplied with coke and most of them could go several months without additional supply. Nevertheless the demand is good, as the car shortage makes the local users feel that they should get on hand as large a supply as possible. Very little is being offered at the price established by the Government.

Old Material.—The supply of scrap has increased materially since the Government embargo went into effect, and there is plenty on hand at present. The supply has been added to materially by several shipments recently received from Mexico. Heavy cast iron scrap is selling about \$33 and plate at from \$25.50 to \$26.

New York

NEW YORK, Dec. 5.

Pig Iron.—Interest centers in the plan of pooling all shipments by railroads in the Central West and East under the direction of committees of railroad men. The process has already been started and many permits to ship pig iron have been revoked with the intention of issuing new permits as soon as the plan is fully arranged. While this action causes some temporary embarrassment, pig iron men regard the situation as hopeful for the reason that the men in charge of the pooling understand their business and are not politicians. Hence it is hoped that the new plan will be speedily worked out in a successful manner. The demand for pig iron is very strong. Another Buffalo steel company, in addition to the one mentioned last week, has been a heavy seller for the last half, having disposed of a considerable tonnage, of which about two-thirds was basic and one-third foundry. There is a decided scarcity of basic and negotiations are now pending for the shipment of a fair tonnage from Birmingham to the Pittsburgh district, a very unusual movement. All kinds of pig iron are scarce and it is believed that if the Government had not reduced the price, as high as \$75 would now prevail. For early delivery we quote as follows, tidewater:

No. 1 X.	.....	\$35.25
No. 2 X.	.....	34.25
No. 2 Plain.	.....	33.75
No. 2 Southern (rail and water).	.....	\$38.75 to 39.25
No. 2 Southern (all rail).	.....	39.15 to 39.65
No. 2 X Virginia.	.....	37.00 to 37.25

Ferroalloys.—It is reported that, as a result of the President's embargo on certain imports, including ferro-

alloys, steps are being taken to place the receipts of imported ferromanganese in the hands of some central body or committee, as in the case of tin. This authority will then regulate the disbursement of such receipts in accordance with the needs of the steel industry as judged by the War Industries Board. Since imports of this alloy have averaged but little over 2000 tons per month recently and as they will probably be still less as time goes on, the task is not formidable nor its effect far-reaching. As bearing on the general domestic situation, it is to be noted that there is talk in the trade of as high as \$3 per unit on manganese ore to stimulate domestic output. The domestic ferromanganese market is steady at \$240 to \$245, furnace. Sales of 2000 to 3000 tons have been made for this and next year's delivery at \$240, and some has brought \$245. Inquiries are fairly numerous, aggregating about 3000 tons for both prompt and first quarter delivery. There is one inquiry for 600 tons for first quarter and another for 500 to 600 tons for shipment this month. Spiegel-eisen is firm at about \$60, furnace. Demand is fair. A sale of 1200 tons for delivery in 1918 is noted. Ferrosilicon, 50 per cent, is scarce and the demand here and from abroad is urgent. The market is quoted from \$150 to \$175 per ton for December and next year, depending on the producer. Sales for December delivery have been made at \$175. An interesting development is the production and sale at \$85 per ton of 10 to 12 per cent ferrosilicon, low in phosphorus and made electrolytically. One new American producer of the 50 per cent alloy reports its product well sold up for 1918.

Finished Iron and Steel.—The most interesting transaction was the closing on Dec. 1 for 2500 tons of rails for a domestic road at \$73 per ton for delivery mostly in January and February. Otherwise business is still chiefly for the Government, and in this connection some complaint is heard of consumers attempting to place entire lots with a single company on A-1 priority business, involving a volume and variety difficult to supply within the time supply. Mills sometimes return such offerings with the suggestion that a distribution among different mills should be made by the priority board. Round lots of bars, chiefly of the smaller sizes, have been sold to jobbers; deliveries on these will be in the first quarter. In plates the talk now is that by April the Government will take all sheared plates $\frac{1}{4}$ in. and heavier. Meanwhile, business has been done on plates chiefly for jobbers, in some cases for the first quarter and others for the first half, but with the stipulation that supplies will not be forthcoming if Government needs intervene. The largest new project in the fabricating field covers the new nitrating plant for the Government in Alabama, this being a reappearance of the request for tenders. Bids will be taken on Friday for a part of the work, which involves in all over 6000 tons, by Westinghouse Church Kerr & Co. Bids were taken Dec. 3 on 950 tons of crane runways and bids are again asked on Washington Navy Yard work, 400 tons, some 1200 tons for foundry additions, however, being about ready for award. The Levering & Garrigues Co. has been awarded 400 tons for work at the submarine base at New London and it appears will supply a 480-ton structure at the Hog Island shipyard, the Belmont Iron Works taking seven and not eight of the buildings. We quote mill shipments of steel bars at 3.095c., New York; shapes 3.195c., plates 3.445c. and bar iron 3.695c., New York. Out of store prices are 1c. higher and to all must be added 3 per cent of the freight charge for the transportation tax.

Cast-Iron Pipe.—Conferences of manufacturers and Government officials in regard to the price of cast-iron pipe have continued and it has been expected from day to day that notice of an agreement would be announced. Pending action on prices, the market is very quiet and nominal quotations continue at \$56.50 for 6-in. and heavier and \$59.50 for 4-in.

Old Material.—The old material market during the past few days has been characterized by very active demand which dealers and brokers have been unable to meet fully on account of the impossibility of getting

the much-coveted permits for shipment. The rules in regard to permits seem to be becoming more strict and the movement of scrap is slow. There is extraordinary demand for relaying rails and some fancy prices are being paid. The market has advanced at least \$10 over recent quotations and in some cases on very desirable heavy sections \$70 has been paid. This extraordinary condition is attributed to the impossibility of obtaining new rails. The demand for foundry scrap is active in all grades except malleable and has advanced at least \$1 per ton. We quote prices of brokers as follows to New York producers and dealers, per gross ton, New York:

Heavy melting steel scrap (for shipment to eastern Pennsylvania)	\$24.00 to \$25.00
Old steel rails (short lengths) or equivalent heavy steel scrap	25.00 to 26.00
Relaying rails	55.00 to 60.00
Rerolling rails	35.00 to 36.00
Iron and steel car axles	41.00 to 42.00
No. 1 railroad wrought	32.00 to 33.00
Wrought-iron track scrap	28.00 to 30.00
No. 1 yard wrought long	28.00 to 30.00
Light iron	9.00 to 10.00
Cast borings (clean)	16.50 to 17.50
Machine-shop turnings	15.00 to 16.00
Mixed borings and turnings	14.00 to 15.00
Wrought-iron pipe (1 in. minimum diameter), not under 2 ft. long	27.00 to 28.00

Dealers in New York City and Brooklyn are quoting as follows to local foundries, per gross ton, but for delivery to cupola platforms of Brooklyn foundries about \$3 more is quoted:

No. 1 machinery cast	\$28.00 to \$29.00
No. 1 heavy cast (column, building materials, etc.)	23.00 to 24.00
No. 2 cast (radiators, cast boilers, etc.)	23.00 to 24.00
Stove plate	20.00 to 21.00
Locomotive grate bars	17.00 to 18.00
Malleable cast (railroad)	27.00 to 28.00
Old carwheels	29.00 to 30.00

Cleveland

CLEVELAND, Dec. 4.

Iron Ore.—Lake ore shipments during November amounted to 7,331,804 gross tons, a decided gain over the corresponding month last year, when the movement was 5,715,452 tons. Weather conditions were very favorable during the month, there being no serious storms to delay the movement of boats. Because of the favorable conditions and efforts of shippers to move as much ore as possible, the November shipments broke all records for that month. Total shipments for the season until Dec. 1 were 61,585,402 tons, a decrease of 2,262,896 tons as compared with the same period of 1916. In the opinion of the ore men, the heavy November movement removes all danger of a shortage this winter as consumers are assured enough ore to cover their minimum requirements until the opening of the season of navigation. With favorable weather, December shipments started out well, and it is expected that 1,500,000 tons of ore will be brought down this month, bringing the Lake movement for the season well over 63,000,000 tons as compared with 64,734,198 tons in 1916. Grain shipments have fallen off and some boats, recently diverted to the grain trade are now carrying ore cargoes. Shippers plan to keep their ore boats moving until about the middle of next week provided cold weather does not put a stop to shipments sooner. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; old range non-Bessemer, \$5.20; Mesaba Bessemer, \$5.70; Mesaba non-Bessemer, \$5.05.

Pig Iron.—The scarcity of pig iron is becoming more acute, this being particularly noticeable in foundry and basic grades. There is a great deal of inquiry for foundry iron for the first half which cannot be supplied by producers in this territory. Some are taking on no additional tonnage, and others are booking contracts for their regular trade for much less than their requirements. Some additional tonnage has been taken for the last half of next year. The scarcity of Northern foundry iron has finally forced consumers to buy Southern grades, as has been predicted. We note the sale of four lots of Southern foundry iron aggregating 1900 tons in Cleveland, the buyer in each case purchas-

ing the Southern iron because he was unable to secure Northern. Figuring out a delivery price for each grade, the Southern iron costs the consumer \$3 more per ton for Tennessee, and \$3.70 more for Alabama iron than for Cleveland iron delivered in Cleveland. Various other inquiries are pending for Southern iron from consumers who have been unable to secure Northern grades. A new basic inquiry has come from a north central Ohio steel plant for 15,000 tons for the first half. Another inquiry for 15,000 tons of basic from southern Ohio is still pending and a northern Ohio consumer is still in the market for 10,000 tons for the second quarter, having purchased only one-half of the 20,000 tons inquired for. The Stewart-Warner Speedometer Corporation is inquiring in this market for 2500 tons of malleable iron for first half for shipment to Beloit, Wis. The Government has placed 600 tons of malleable iron with Cleveland selling agencies. Apparently no Ohio silvery iron is to be had for the first half. Many foundries are crowding furnaces for shipments, and no requests have come from foundries engaged largely in automobile work to hold up shipments. One of the largest Michigan foundries engaged in making automobile castings has advised furnaces that it is willing to have shipments delayed for a short time, but wishes to take every ton of iron contracted for before July 1. We quote delivered Cleveland, as follows:

Bessemer	\$37.25
Basic	33.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phos. Valley furnace	50.00

Coke.—The scarcity of foundry coke has become more acute. Some brokers have been able to cover their regular trade with contracts, but have no more coke to offer, and there is a large volume of inquiry for contracts for the first half and full year. Consumers fear that they will be forced to shut down their plants for lack of fuel, and many would buy a large supply of spot coke and store it were they able to obtain it. We quote standard Connellsville furnace coke at \$6 per net ton at oven, and foundry coke at \$7.

Finished Iron and Steel.—New demand for steel for Government work continues heavy. With the cleaning up of some of the high-priced tonnage by the mills, buyers are having less trouble in securing steel for early shipment. The Midvale Steel & Ordnance Co. and the Cambria Steel Co. are now offering for early shipment steel bars in a wide range of sizes, mostly in Bessemer steel, Bessemer billets and sheet bars and light plates. There is a great deal of inquiry for sheet bar contracts for the first quarter, but the supply is scarce. We note the sale of a 3500-ton lot to a Northern Ohio consumer for December-January shipment. We also note the sale of 4000 tons of steel bars to Cleveland jobbers. Consumers, largely in the automobile field, are still urging mills to cancel high-priced contracts, and one independent mill is cancelling these contracts, provided the consumer accepts the cancellation of an equal tonnage of low-priced steel. If the mill has none of the latter on its books, cancellation is refused. The manufacturers of automobile parts are being seriously affected by the reduction in the manufacture of pleasure cars and have held up considerable steel tonnage which they wish to have cancelled. Some bolt and rivet manufacturers are still trying to get readjustments of high-priced contracts. The demand for plates is heavy, and the prices quoted by mills having high-priced slab contracts continues to ease off. Plates are now being generally quoted at 4.25c. by a Cleveland mill, although small lot sales at 5c. have not disappeared. The Emergency Fleet Corporation, which recently purchased a round lot of boilers for wooden vessels is now taking bids for 420 water tube boilers for steel vessels. These will require 10,000 to 12,600 tons of steel including the tubes. One Eastern mill that has been selling Universal plates at the Government price for early shipment is now filled up and has withdrawn from the market. Hard steel bars are quiet and are quoted at 3.25c. at mill. The demand for sheets continues very active, much of the tonnage being for Government work. Some of the sheet mills are sold up for the first quarter. Some contracts are being taken

for the first half. Jobbers are now finding little opportunity to take car lot orders for sheets and other steel products, as mills insist on selling direct at the Government price instead of allowing the jobber the usual \$1 commission on these orders. Cleveland jobbers are now quoting uniform stock prices taking the full amount allowed by the Government, instead of cutting off the 3½c. per 100 lb. that has been done by some since the price regulation. We quote warehouse prices as follows: Steel bars, 4.03½c.; plates, 4.38½c.; structural material, 4.13½c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

Bolts, Nuts and Rivets.—There is a heavy demand for bolts, nuts and rivets. Railroads and other consumers are buying bolts and nuts freely for the first half, and a great deal of business is coming out for Government work. An Eastern shipyard has placed 15,000 tons of rivets, 10,000 of these going to a Cleveland manufacturer. An inquiry for 3000 tons is pending from a Southern shipyard and a large amount of business is expected to be placed shortly by other shipyards. We quote rivets at 4.65c., Pittsburgh, for structural and 4.75c. for boiler rivets.

Old Material.—The market has stiffened up considerably, and while it has continued quiet during the week, there are indications of increasing activity. Some consumers are inquiring for scrap, and it is expected that there will be an active market during the latter part of the month, as shipments on contracts to many mills will be cleaned up by the end of December. Dealers are paying somewhat higher prices for heavy melting steel to cover short sales, and this grade is reported to have sold as high as \$30, or the maximum price fixed by the Government. Cast scrap is firmer and in somewhat better demand because of the scarcity of pig iron. The first transactions in busheling reported in this market for some time were made during the week, two mills taking 750 tons at \$24. We quote f.o.b., Cleveland, as follows:

Per Gross Ton	
Steel rails	\$26.00 to \$27.00
Steel rails, rerolling	36.00 to 37.00
Steel rails, under 3 ft.	30.00 to 31.00
Iron rails	35.00 to 36.00
Steel car axles	45.00 to 46.00
Heavy melting steel	29.00 to 30.00
Cast borings	18.00 to 18.40
Iron and steel turnings and drillings	18.25 to 18.75
No. 1 railroad wrought	34.00 to 35.00
Hydraulic compressed steel scrap	24.00 to 25.00
Carwheels	26.50 to 27.50
Relaying rails, 50 lb. and over	50.00 to 60.00
Agricultural malleable	22.00 to 23.00
Railroad malleable	27.00 to 28.00
Steel axle turnings	22.00 to 23.00
Light bundled sheet scrap	20.00 to 20.50

Per Net Ton	
Iron car axles	\$44.00 to \$45.00
No. 1 busheling	24.00
No. 1 cast	23.50 to 24.50
Railroad grate bars	17.25 to 17.75
Stove plate	17.25 to 17.75

The Central Division of the American Board of Scrap Iron Dealers, recently formed in Cleveland, completed its organization at a meeting held last week. A. J. Bialosky was named as permanent chairman, M. A. Cohen, vice-chairman, and Morris Friedman, secretary. Thirty leading dealers in Cleveland, Youngstown and other Ohio cities and Detroit are represented in the organization which will co-operate with the Eastern Division at Philadelphia and the Western Division at Chicago. It is the intention to establish an Inspection Bureau.

Large Forging Plant at Gary

Significant in connection with the expansions of capacity in various metal working lines to take care of Government demand, is the decision of the United States Steel Corporation, just announced, to build a large forging plant at Gary, Ind.

A meeting of the stockholders of the Liberty Steel Co., Warren, Ohio, will be held Dec. 14 to take action on a proposal to increase the capital stock from \$500,000 to \$600,000.

IRON AND INDUSTRIAL STOCKS

Public Holds Off and Waits for Gage of Congress' War Policy

NEW YORK, Dec. 5.

Rather unfavorable news developments the past week tended to force price levels slightly lower. The Russo-German truce and the Lansdowne letter more than offset the optimistic influence of the successful British offensive before Cambrai. A general desire to await the opening of Congress, in order to get a more definite idea of the Government's war policies, has also cut down transactions. Securities, however, displayed a strong resistance to a rather generally adverse situation.

Slight declines were recorded in most cases, although some industrials showed small advances: American Car & Foundry, com., 1/4; Baldwin Locomotive, com., 1/4; International Harvester of New Jersey, com., 4. The falling off in steel stocks was: Bethlehem Steel, com., 2 1/2, and Class B, 2; Colorado Fuel & Iron, com., 1/2; Crucible Steel, com., 1%; Lackawanna Steel, com., 1/2; Midvale Steel, com., 1%; Superior Steel, com., 2 1/2; United Alloy Steel, com., 1/2; U. S. Steel, com., 1/2, and pref., 1.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	17 1/4 - 19 1/4	Int. Har. of N. J.	110
Am. Can com.	32 1/2 - 37	pf.	110
Am. Can pf.	96 - 97	Lack. Steel	80 3/4
Am. Car & Fdry. com.	65 - 66 1/4	Lake Sup. Corp.	11 1/2 - 12
Am. Car & Fdry. pf.	105	Midvale Steel	41 - 44
Am. Loco. com.	50 - 54	Nat.-Acme	28 1/4
Am. Loco. pf.	97 1/2	Nat. En. & Stm.	36 1/2 - 38 1/2
Am. Ship com.	92 - 93	N. Y. Air Brake	108 1/2 - 109
Am. Steel Fdries.	54 1/2 - 56 1/2	Nova Scotia Steel	65 - 68 1/2
Bald. Loco. com.	54 - 55 1/2	Pitts. Steel pf.	87 - 90
Beth. Steel com.	75 - 81	Press. Steel com.	50 1/2 - 54
Beth. Steel, Cl. B.	74 1/2 - 81 1/4	Press. Steel pf.	94
Beth. Steel pf.	85 - 85 1/2	Ry. Steel Sp. com.	40 1/2 - 42
Cambria Steel	116	Republic com.	74 1/2 - 78 1/2
Cent. Fdry. com.	29 1/2 - 30	Republic pf.	94 1/2 - 95 1/2
Cent. Fdry. pf.	41	Sloss com.	36 - 38 1/2
Char. Iron com.	7 1/2	Superior Steel	33 1/2 - 36 1/2
Chic. Pn. Tool	45 - 49	Superior Steel 1st pf.	96 1/2 - 98 1/2
Colo. Fuel	33 - 35	Un. Alloy Steel.	36 1/2 - 37
Crucible St. com.	52 1/4 - 56 1/4	1st pf.	36 1/2 - 37
Crucible St. pf.	91 1/2	U. S. Pipe com.	12 - 12 1/2
Deere & Co. pf.	95	U. S. Pipe pf.	46 - 48
Gen. Electric	126 1/2 - 130 1/2	U. S. Steel com.	87 1/2 - 97 1/2
Gt. No. Ore. Ct.	26 - 27 1/2	U. S. Steel pf.	107 1/2 - 109 1/2
Gulf States Steel	84 1/2 - 88	Va. I. C. & Coke	52 1/2
Int. Har. of N. J. com.	107 1/2 - 114 1/2	Warwick	8 1/2
		Westingh. Elec.	37 1/2 - 39 1/2

Dividends

The American Can Co., quarterly, 1% per cent on the preferred, payable Jan. 2, and 3.7157 per cent, being the final payment of accumulated dividends on the preferred, payable Dec. 20.

The Charcoal Iron Co. of America, quarterly, 20c. on the common and 30c. per share on the preferred, payable Dec. 31.

The General Electric Co., quarterly, 2 per cent, payable Jan. 15.

The La Belle Iron Works, quarterly, 3 per cent and extra 2 per cent on the common and 2 per cent on the preferred, all payable Dec. 22.

The Moline Plow Co., quarterly, 1 1/4 per cent on the second preferred, payable Dec. 1.

The Worthington Pump & Machinery Co., quarterly, 1% per cent on preferred A and 1 1/2 per cent on preferred B, payable Jan. 2.

The Yale & Towne Mfg. Co., extra 5 per cent, payable Dec. 24.

Industrial Finances

The Wharton Steel Co., Wharton, N. J., has recently called a special meeting of shareholders to increase the capital of the company from \$3,000,000 to \$10,000,000.

The Solvay Process Co., Solvay, N. J., has called a meeting of the stockholders on Dec. 18, to increase the capital stock of the company from \$18,000,000 to \$36,000,000.

The Plattsburgh Alloys Corporation, Plattsburgh, N. Y., has increased its capital stock from \$60,000 to \$125,000 to provide for plant extensions.

The Yale & Towne Mfg. Co., Stamford, Conn., has declared an extra dividend of 5 per cent, payable Dec. 24 to stock of record Dec. 17.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 35.5c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c.; minimum carload, 40,000 lb. and 85c.; minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 40c. per 100 lb., minimum carload 46,000 lb.; to Omaha 40c., minimum carload 46,000 lb., to St. Paul 35.5c., minimum carload 46,000 lb.; Denver 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, $\frac{1}{4}$ in. thick and over, and zees 3 in. and over, 3c.

Wire Products

Wire nails, \$3.50 base per keg; galvanized, 1-in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2, and shorter than 1-in., \$2.50. Bright basic wire, \$3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.25; galvanized wire, \$3.95; galvanized barb wire, and fence staples \$4.35; painted barb wire, \$3.65; polished fence staples, \$3.65; cement-coated nails, \$3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets	\$4.65 base
7 1/2 in. to 6 in. smaller and shorter rivets	45-10 per cent off list
Machiné bolts h.p. nuts, $\frac{1}{4}$ in. x 4 in.	
Smaller and shorter, rolled threads	50-10-5 per cent off list
Cut threads	50-5 per cent off list
Larger and longer sizes	40-10 per cent off list
Machiné bolts, c.p.c. and t nuts, $\frac{1}{4}$ in. x 4 in.	
Smaller and shorter	40-10 per cent off list
Larger and longer	35-5 per cent off list
Carriage bolts, $\frac{1}{4}$ in. x 5 in.	
Smaller and shorter, rolled threads	50-5 per cent off list
Cut threads	40-10-5 per cent off list
Larger and longer sizes	40 per cent off list
Lag bolts	50-10 per cent off list
Flow bolts, Nos. 1, 2, 3	50 per cent off list
Hot pressed nuts, sq. blank	2.50c. per lb. off list
Hot pressed nuts, hex., blank	2.30c. per lb. off list
Hot pressed nuts, sq., tapped	2.30c. per lb. off list
Hot pressed nuts, hex., tapped	2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank	2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped	2.00c. per lb. off list
Semi-finished hex. nuts	
$\frac{1}{4}$ in. and larger	60-10-10 per cent off list
$\frac{9}{16}$ in. and smaller	70.5 per cent off list
Stove bolts	70-10 per cent off list
Stove bolts	2 1/2 per cent extra for bulk
Tire bolts	50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$57; chain rods, \$65; screw, rivet and bolt rods and other rods of that character, \$65. A tentative differential of \$10 per ton over soft rods for high carbon rods has been agreed upon.

Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. and larger, \$5 to \$5.50; 7/16 in. and 1/2 in., \$7. base. Boat spikes, \$5.25 per 100 lb., f.o.b. Pittsburgh. Track bolts with square nuts, 7c. to 7.50c. to railroads, and 8c. to 8.50c. in small lots for fairly prompt shipment.

Terne Plate

Effective Nov. 7, prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., \$15 per package; 8-lb. coating, I. C., \$15.30; 12-lb. coating, I. C., \$16.75; 15-lb. coating, I. C., \$17.75; 20-lb. coating, I. C., \$19; 25-lb. coating, I. C., \$20; 30-lb. coating, I. C., \$21; 35-lb. coating, I. C., \$22; 40-lb. coating, I. C., \$23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. for delivery late this year, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld			Iron		
Inches	Steel	Black	Galv.	Inches	Black
$\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$	44	17 1/2	$\frac{1}{4}$ and $\frac{1}{2}$	23	+4
$\frac{1}{2}$	48	33 1/2	$\frac{1}{2}$	24	+3
$\frac{3}{4}$ to 3	51	37 1/2	$\frac{3}{4}$	28	10
			$\frac{3}{4}$ to 1 1/2	33	17

Lap Weld			Butt Weld, extra strong, plain ends		
Inches	Steel	Black	Inches	Steel	Black
2	44	31 1/2	$\frac{1}{4}$	18	3
$\frac{3}{4}$ to 6	47	34 1/2	$\frac{1}{2}$	25	11
7 to 12	44	30 1/2	$\frac{3}{4}$	26	12
13 and 14	34 1/2	...	2 1/2 to 6	28	15
15	32	...	7 to 12	25	12

Lap Weld, extra strong, plain ends			Butt Weld, extra strong, plain ends		
Inches	Steel	Black	Inches	Steel	Black
$\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$	40	22 1/2	$\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$	22	5
$\frac{1}{2}$	45	32 1/2	$\frac{1}{2}$	27	14
$\frac{3}{4}$ to 1 1/2	49	36 1/2	$\frac{3}{4}$ to 1 1/2	33	18
2 to 3	50	37 1/2	9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5 1/2 points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		Charcoal Iron	
3 1/2 to 4 1/2	34	3 1/2 to 4 1/2 in.	12 1/2
2 1/2 to 3 1/2 in.	24	3 to 3 1/2 in.	+ 5
2 1/2 in.	17 1/2	2 1/2 to 2 1/2 in.	+ 7 1/2
1 1/2 to 2 in.	13	2 to 2 1/2 in.	+ 22 1/2
		1 1/2 to 1 1/2 in.	+ 35

Standard Commercial Seamless—Cold Drawn or Hot Rolled		Per Net Ton		Per Net Ton	
1 in.		\$340	1 1/2 in.		\$220
1 1/2 in.		280	2 to 2 1/2 in.		190
2 1/2 in.		270	2 1/2 to 3 1/2 in.		180
1 1/2 in.		220	4 in.		200
			4 1/2 to 5 in.		220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days. [Open-hearth stock, \$5 per ton above these prices.]

Blue Annealed—Bessemer		Cent per lb.	
Nos. 3 to 8		4.20	
Nos. 9 and 10		4.25	
Nos. 11 and 12		4.30	
Nos. 13 and 14		4.35	
Nos. 15 and 16		4.45	

Box Annealed, One Pass Cold Rolled—Bessemer

Nos. 17 to 21		4.80
Nos. 22 and 24		4.85
Nos. 25 and 26		4.90
No. 27		4.95
No. 28		5.00
No. 29		5.05
No. 30		5.15

Galvanized Black Sheet Gage—Bessemer

Nos. 10 and 11		5.25
Nos. 12 and 14		5.35
Nos. 15 and 16		5.50
Nos. 17 to 21		5.65
Nos. 22 and 24		5.80
Nos. 25 and 26		5.95
No. 27		6.10
No. 28		6.25
No. 29		6.50
No. 30		6.75

Tin-Mill Black Plate—Bessemer

Nos. 15 and 16		4.80
Nos. 17 to 21		4.85
Nos. 22 to 24		4.90
Nos. 25 and 27		4.95
No. 28		5.00
No. 29		5.05
No. 30		5.05
Nos. 30 1/2 and 31		5.10

Metal Markets

The Week's Prices

Cents Per Pound for Early Delivery							
	Copper, New York	Tin,	Lead	Spelter			
	Electro-	New	New	St.	New	St.	
Nov.	Lake	Lytic	New York	St. Louis	New York	St. Louis	
28.....	23.50*	23.50*	80.00*	6.50	6.37 1/2	8.00	7.75
30.....	23.50*	23.50*	80.00*	6.50	6.37 1/2	8.00	7.75
Dec.							
1.....	23.50*	23.50*	...	6.50	6.37 1/2	8.00	7.75
3.....	23.50*	23.50*	80.00*	6.50	6.37 1/2	8.00	7.75
4.....	23.50*	23.50*	80.00*	6.50	6.37 1/2	8.00	7.75

*Nominal.

NEW YORK, Dec. 5.

The markets have nearly all come to a halt. Copper is unchanged at the controlled prices, both wholesale and jobbing. Tin is unobtainable and is unchanged at nominal quotations. Lead continues inactive but firm at unchanged levels. Spelter is very dull and unchanged at nearly nominal prices. Antimony is more active and higher.

New York

Copper.—With the large majority of copper consumers, especially the large buyers as well as many smaller ones, almost entirely engaged on Government work at controlled prices, there is no market in the accepted sense. There have been no developments since last week and there is nothing to add to what was said then. The Government price of 23.50c. to large buyers and of 24.67 1/2c. for jobbing lots continue to rule under the usual restrictions. It is now generally understood and accepted that jobbers cannot sell their stocks, no matter what they cost, at a higher price than 24.67 1/2c. This eliminates practically all business between small dealers. It is stated that production in November was larger than that of October, but far short of the 1916 maximum, and that the supply for domestic consumption is inadequate with the prospect that it will continue so for some time.

Copper Averages.—In the absence of any sales of Lake or electrolytic copper at the Government or any other price for commercial use in quantities sufficient to establish a market, there is no monthly average based on quotations in THE IRON AGE possible. The Government price of 23.50c. has been quoted regularly as nominal.

Tin.—The market has come to a decided halt. The only news feature is the fact that the tin in warehouses, which was announced as commandeered last week by the Government, has been released except that which was appropriated to Government needs. The metal is again in the hands of the original owners, subject to distribution as determined by the American Iron and Steel Institute. The market is under complete Government control similar to copper. Quotations are entirely nominal at 80c., New York, for spot Straits. The market is extremely quiet with demand very light. Buyers show no interest in any position or any grade, both Banca and Chinese tin being scarce and nominal. Arrivals this week to Dec. 4 inclusive have been 325 tons, with the quantity afloat not reported. The London market for spot Straits continues to soar, it being quoted yesterday at £294 per ton, an advance of £10 in the week.

Lead.—Little or no business is reported, and the market is dull with conditions unchanged in the last week. Prices are firmly held at previous levels, the outside market standing at not less than 6.50c., New York, or 6.37 1/2c., St. Louis. The leading producer continues to ask 6.25c., New York. There is no pressure to sell, and buyers are not anxious to purchase. Lead in transit in carload lots or less has sold recently at 6.75c.

Spelter.—The market for prime Western is still lifeless. Demand is insignificant and sales are of small consequence marketwise. There has been practically no change since last week with prime Western for early

delivery still quoted at 7.75c., St. Louis, or 8c. New York, with shading of these levels possible and probable. There are no developments in the price fixing program, with nothing definite made public as to the activities of the new Zinc Committee. The trade in general is waiting to see what action will be taken.

Antimony.—As high as 15c. per lb., duty paid, New York, was bid yesterday for Chinese and Japanese grades. Sales are reported as high as 15.25c. for early delivery. The market has taken a sudden spurt as a result of the probable effect of the President's embargo on imports, including antimony and antimony ore. The new arrangement is expected to limit available spot and nearby supplies.

Aluminum.—The market is inactive. No. 1 virgin metal, 98 to 99 per cent pure, is unchanged at 36c. to 38c. per lb., New York.

Old Metals.—The market is practically unchanged. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible (nominal)	23.50
Copper, heavy and wire (nominal)	23.50
Copper, light and bottoms	21.00 to 22.99
Brass, heavy	17.25 to 17.50
Brass, light	12.00 to 12.50
Heavy machine composition	23.75 to 24.00
No. 1 yellow rod brass turnings	15.00 to 15.25
No. 1 red brass or composition turnings	19.00 to 19.50
Lead, heavy	6.00
Lead, tea	4.50
Zinc	6.00

Chicago

DEC. 3.—Jobbers in copper continue to lack official guidance as to their selling price for the copper they hold. They understand that the recently announced basis of 23.50c., plus 5 per cent, applies to part carload lots sold by producers, and they are firm in their belief that the Government is willing that they should make a fair profit. While any Government needs, direct or indirect, would be filled at 23.50c., jobbing lots have been sold in the past week at 26c. to 28c., and in the aggregate a fair amount has been disposed of. It is felt that there may be a pinch in copper, in view of there being considerable unsatisfied inquiry, but up to the present time no consumers have found it necessary to suspend operations. In general, the metal market has been quiet. Antimony is a little stronger. The market for old metals is exceptionally quiet. We quote as follows: Castings, Lake and electrolytic copper, 26c. to 28c.; tin, carloads, 81c. to 82c.; small lots, 86c.; lead, 6.25c. to 6.50c.; spelter, 7.75c. to 8c.; sheet zinc, 19c.; antimony, 16c. to 16.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 19.50c.; yellow brass, 14.50c.; lead pipe, 5c.; zinc, 5c.; pewter, No. 1, 40c.; tinfoil, 47.50c.; block tin, 52.50c.

St. Louis

DEC. 3.—The non-ferrous metals have shown some slight changes in price during the week, but there have been no marked incidents to note. The close to-day in carload lots for the Missouri product was: Lead, 6.37 1/2c.; spelter, 7.75c. to 7.87 1/2c. In less than carload lots the close was: Lead, 6.75c.; spelter, 8.50c.; tin, 86c.; copper, 25.12c. (government figure at this point); Asiatic antimony, 18c. In the Joplin district, on account of the shortage of railroad cars there was indifference on the part of buyers with the result that there was a lowering of prices in the bulk of the sales, though the price range stood at \$52.50 to \$72.50 per ton basis of 60 per cent metal. Calamine was quiet at \$35 to \$37 per ton basis of 40 per cent metal, with an average for the district for the week of \$36 per ton. Lead ore was steady at \$75 per ton, basis of 80 per cent metal, and the average for the week for the district was \$75 per ton. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper, and copper wire, 20c.; pewter, 25c.; tinfoil, 42c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

Pittsburgh and Nearby Districts

The Fobewood Coal & Iron Co. recently opened offices in the Farmers Bank Bldg., Pittsburgh, in charge of W. W. Woodruff, president and treasurer, and at 1103 Little Bldg., Boston, in charge of S. D. Fobs, vice-president. Mr. Woodruff also is connected with the Aetna Foundry & Machine Co., Warren, Ohio. The Fobewood company handles furnace and foundry coke, and steam, gas and smithing coal.

In November, the Valley Mold & Iron Corporation shipped from its two plants at Sharpsville and West Middlesex, Pa., 32,617 net tons of ingot molds, the largest output and shipment of ingot molds ever made by this concern in one month. In October, Alice blast furnace of this company at Sharpsville made 9778 tons of basic iron, and in November, 9303 tons. The company recently made shipments of 48 cars of ingot molds in one day, a record shipment for 24 hours.

The Standard Steel Car Co. Pittsburgh works at Butler, Pa., is working on several large Government orders for cars, and has lately bought considerable machine shop equipment, including radial drills, shapers, lathes and boring mills.

The Flood City Mfg. Co., Johnstown, Pa., has increased its capital from \$15,000 to \$100,000 to provide for plant extensions, including a 4-story steel and concrete factory to be erected. J. E. Hershberger is general manager of the company.

The United Connellsville Coke Co. of Pittsburgh has issued notices to stock holders of that concern that a meeting will be held in the company's offices, Henry W. Oliver Building, Dec. 17, to ratify or reject a proposition to consolidate and merge the following companies: United Connellsville Coke Co., Hillman-Neff Coke Co., Bessemer Coke Co. and the Hecla Coal & Coke Co. It is explained that the move is planned as a means of cutting down overhead expenses and more fully complying with Government regulations with regard to the output of coke.

A foundry war machine shop in Brownsville, Pa., founded in 1837, has been sold by J. Herbertson's Sons to Ira E. Stevens and William P. Walker, Pittsburgh, who will take over the property on Dec. 15.

Manufacturers Sell Coal to Employees

A number of manufacturing plants in the East have been obliged to contend with a peculiar condition, which is eating into their surplus stocks of coal, if they happen to be so fortunate as to possess any surplus. Their employees have frequently been unable to obtain sufficient coal for their homes and have applied to their employers for relief. Even at the risk of entirely exhausting their supply and being obliged to shut up shop, the manufacturers have invariably found it good policy to sell coal to their workmen. The aggregate of such transactions probably is not large, as figured in tonnage, but the handling of this retail business has been a source of additional expense.

The Liberty engine and the reasons for its 12-cylinder design are the subject of an address to be made before the Society of Automotive Engineers, New York, Thursday afternoon, Jan. 10, by Major Jesse G. Vincent, who was largely responsible for the design and who is now in charge of its development at the aviation headquarters in Dayton, Ohio.

Lifting magnets on the European continent are reported to have been wound for some time past with aluminum wire because of the shortage of copper. On account of the lesser conductivity of aluminum it has been found that the expenditure of current is 20 per cent greater to yield the same results.

The Scovill Mfg. Co., Waterbury, Conn., has declared an extra dividend of \$5, payable Dec. 1 to stock of record Nov. 25. The company has paid cash dividends of \$123 this year and paid a special dividend of 25 per cent in Anglo-French bonds in January of this year.

Women in German Munition Plants

The extent and character of the employment of women in German munition plants is given in a memorandum published in the London *Ironmonger* as issued by the executive committee of the German Metal Workers' Trade Union. In part it is as follows:

Woman labor is used most extensively in the manufacture of shells. In 1912 there were 246 women turners; now (Sept., 1917) there are 5926. Women are employed in all kinds of work, regardless of their physical fitness. Instances of superhuman efforts demanded of women, which have frequently resulted in serious physical injury, are frequent lifting of shrapnel shells weighing about 60 lb., without assistance of any kind, and lifting of projectiles weighing 20 to 75 lb. from floor to breast level. For 3 marks a day a woman must perform this exhausting task from 70 to 100 times and even more. Of a steel works in Upper Silesia it is reported: "Women and girls look like walking columns of dust—lavatories are frequently not provided; the women in the foundries are hollow-eyed and with eyes deeply sunken; their expression is pathetic; all joy in life is lost." For the exhausting work of boiler scaling men are paid extra, but women are not. In the Krupp works at Duisburg and Essen there is neither ventilation nor suction apparatus. The workers themselves have to fix the belts, a dangerous operation for a woman. The working hours, already long, are further lengthened by night and Sunday work. Where the 48-hr. week is in force, as in Berlin, overtime and Sunday work leave little leisure. Over 40 per cent of all the women employees have a 12-hr. day and less than 4 per cent work as short a time as 10 hr. The longest working week is in the government small arms factory in Dantzig, with 78 hours. In one plant at Dresden girls have repeatedly worked from 7 a. m. till 11 p. m., with an interval of one hour, and in another at Leipzig some women worked through the whole of Saturday until 2 or 4 a. m. on Sunday—16 or 18 hours in one shift.

A Warning on Coke Overcharge

Fuel Administrator Garfield has issued an order in view of reports coming to the fuel administration that coke producers in some instances had been selling "72-hour" coke to blast furnaces and taking advantage of the \$1 differential allowed on 72-hour selected foundry coke. The order points out that any person guilty of asking, demanding, or receiving higher prices than are allowed under the fuel price regulations shall upon conviction be fined not more than \$5,000 or be imprisoned not more than two years, or both.

In making the order the Fuel Administrator established prices on by-product coke produced in New England. New England coke producers will be permitted to charge prices that will cover their increased transportation charges on coal carried to New England by water for use in coke manufacture. The order fixes New England coke prices as follows:

For coke produced in New England, the maximum price for each grade, f.o.b. cars at point of production, shall be the base price for the grade of coke, plus the freight rate from the competing beehive coke district which takes the lowest freight rate to the point where the coke is produced, and plus 7 cents for each advance of 5 cents above 60 cents in the freight charges per ton (2240 lb.) of coal for water transportation on the coal used in the manufacture of such coke. The base prices are as follows: Run of ovens, \$6; selected foundry, \$7; and crushed over 1-in. size, \$6.50.

In Technical Paper 98 of the U. S. Bureau of Mines by S. H. Kratz and H. C. Porter, entitled "Effect of Low Temperature Oxidation on the Hydrogen in Coal and the Change in Weight of Coal on Drying," the authors state that there is a lack of agreement between the weight of water evolved by coal and the loss of weight when dried in an inert atmosphere. The excess weight of the coal may be due to adsorption of gas.

The Portsmouth Solvay Coke Co., Portsmouth, Ohio, made a preliminary test of its new plant last week and 10 ovens are now in full operation.

PERSONAL

Ralph P. Zint, latterly identified with the Federal Export Corporation and the Commercial Iron & Steel Corporation, New York, has been made manager of the steel department of the recently organized Swiftsure Export Corporation, 120 Broadway, New York. This company is owned by the France & Canada Steamship Co., whose officers are also officers of the export subsidiary. J. P. H. Mertens, long identified with the export business, formerly in Belgium and later with the Federal Export Corporation, is general manager of the company. The company has offices in London, Paris, Montreal and Boston. It operates 29 vessels of 141,721 tons carrying capacity.

Vere Brown, formerly assistant general manager of the Allegheny Steel Co., Brackenridge, Pa., has been appointed general manager to succeed W. Lester Walker, who died on Oct. 7. E. P. Perkins, formerly superintendent of the plate mill, has been made assistant general manager to succeed Mr. Brown. Vere Brown was formerly in the metallurgical department of the Dominion Iron & Steel Co., at Sydney, N. S., and went with the Allegheny Steel Co. in January, 1909, in the metallurgical research department. In 1914 he was made assistant general manager to W. Lester Walker. J. G. Rohrman, district sales manager in the Chicago office of the Allegheny Steel Co., 1113 People's Gas Building, has been granted a six months' leave of absence on account of sickness. J. L. Harrison, in the plate mill division of the plant of the Allegheny Steel Co., at Brackenridge, will take care of the duties of Mr. Rohrman during his absence.

McClelland M. Harper, in the order and supply department of the Jones & Laughlin Steel Co., Pittsburgh, has been appointed assistant to J. A. Parker, superintendent of the National Bureau of Exports at Washington.

Roy M. Welch, formerly special agent of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has been named assistant to President J. A. Campbell, to succeed Dudley R. Kennedy, who resigned to become head of the industrial relation department of the American International Shipbuilding Corporation. Mr. Welch had formerly been with the Carnegie Steel Co., but left that concern in 1902 to go with the Youngstown Sheet & Tube Co. He was first connected with the store and purchasing departments, then was secretary to C. S. Robinson, vice-president, and later was made special agent.

Thomas L. Robinson, chairman of the board of the Republic Rubber Co., Youngstown, Ohio, has been granted a six months' leave of absence to engage in Red Cross work in Italy.

W. R. Yagle, formerly associated with the Lawrence Steel Castings Co., Pittsburgh, has become office manager of the Hall Steam Pump Co., of that city.

J. F. Adey, until recently superintendent of the Stone & Webster Corporation at Youngstown, Ohio, has gone to France to head a division of Stone & Webster work on the U. S. Government ordnance buildings in the European country.

Sherwood H. Standish, formerly assistant superintendent of the Northwestern Malleable Iron Co., Milwaukee, has become works manager of the Stowell Co., founder and manufacturer, South Milwaukee.

E. W. Ames and A. G. Dowden, representing the American Steel Export Co., New York, are about to sail for Japan on a business trip. The officers of the company gave a dinner in their honor at the Waldorf-Astoria on the evening of Nov. 28.

R. Gardner Kellogg, vice-president Mechanical Appliance Co., Milwaukee, has enlisted as a private in response to a call for 1200 volunteers from Wisconsin to fill National Guard regiments now in federal service at Camp MacArthur, Waco, Tex.

Allen C. House, of the iron ore department of M. A.

Hanna & Co., Cleveland, has received a commission as first lieutenant in the Field Artillery of the United States Army, and Andre T. Chisholm, vice-president of the Chisholm Steel Shovel Works, Cleveland, has been commissioned as captain of infantry. Both attended the recent officers' training camp at Fort Benjamin Harrison, Indianapolis.

At a recent meeting of the Owens Bottle Machine Co., Toledo, Ohio, John G. Biggers, former treasurer, was elected assistant general manager, and J. C. Blair, former controller, was elected treasurer and a member of the board of directors.

Henry J. Fuller, vice-president of Fairbanks, Morse & Co., New York, and president of the Canadian Fairbanks Morse Co., has been elected president of E. & T. Fairbanks & Co., scale manufacturers, St. Johnsbury, Vt. P. C. Brooks, vice-president of the Canadian Fairbanks Morse Co., who has direct charge of the manufacturing operations, has been appointed general manager of E. & T. Fairbanks & Co. and will make his headquarters at the plant at St. Johnsbury.

J. H. Schneider originally with the Lodge & Shipley Machine Tool Co., more recently with the Gurney Electric Elevator Co., Honesdale, Pa., as assistant superintendent in charge of special organization and engineering work, will be head of the efficiency department of the American Tool Works Co., Cincinnati.

R. H. Chapin, assistant general manager and director of sales for the Porter Mfg. Co., Ann Arbor, Mich., resigned to accept a Government position in the inspection section, Detroit district, equipment division of the United States Signal Corps.

B. L. Neis, formerly in charge of the car shipments of the Maxwell Motor Co., is now a lieutenant attached to the ordnance department.

M. R. Bissell, Jr., vice-president of the Bissell Carpet Sweeper Co., Grand Rapids, Mich., has left for Camp MacArthur, Waco, Texas, where he hopes to be assigned to the aviation division.

F. W. Clafin, of the staff of Perin & Marshall, consulting engineers, New York, sailed from Vancouver on Nov. 22 to erect at Sakchi, India, for the Tata Iron & Steel Co. the blast furnace recently dismantled at Battelle, Ala., for erection in India to make ferromanganese.

John T. Nielson, Piqua, Ohio, has been elected secretary of the Greater Dayton Association, Dayton, Ohio, an organization of more than 2000 members, and one that includes all of the principal manufacturers of that city.

E. C. Sickles, recently works engineer of the Hyatt Roller Bearing Co., Newark, has joined the Lackawanna Bridge Co. in connection with the shipbuilding activities of the company at Port Newark, N. J.

William C. Wright, formerly in charge of the track department in the Cleveland district for the Bethlehem Steel Co., and since March 1, 1917, associated with the Read-Rittenhouse Co., Philadelphia, steel merchant, has been commissioned captain in the Ordnance Division of the United States Army.

Emil P. Albrecht, well known in Philadelphia machinery circles, having organized and managed the Machinery Exhibition in the Bourse, has been elected president of the Philadelphia Bourse, succeeding George E. Bartol, who died Nov. 13. Alexander Duncan Chi-quone, Jr., who has been assistant secretary, was elected to the secretaryship made vacant by Mr. Albrecht's promotion.

Shipments of Swedish iron ore fell off decidedly in 1916. From the two ports of Narvik, in Norway, and Lulea, in Sweden, 2,668,535 metric tons were exported as compared with 3,584,814 tons in 1915 and 3,310,579 tons in 1914. About 60 per cent of the 1916 exports passed through the port of Lulea.

The National Association of Corporation Schools will hold its next annual convention in Chicago the first week of June, 1918.

PIG-IRON FREIGHT TO CANADA

An Advance Asked from Cincinnati Involves Other Ohio River Points

WASHINGTON, Dec. 4.—The Baltimore & Ohio, Cincinnati, Hamilton & Dayton and the Pittsburgh, Columbus, Cincinnati & St. Louis railroads have filed an application with the Interstate Commerce Commission for permission to increase the rate on pig iron from Cincinnati to Windsor, Sarnia, Hamilton and other points in Ontario from \$2.10 per gross ton to \$2.46.

Admitting that no pig iron is produced at Cincinnati, they have informed the commission they desire to establish the higher rate to enable them to use it as a "base for rates elsewhere." They have told nothing more about their desire to make rates at points other than Cincinnati and thus far the commission has not required them to make any further disclosure of their plans.

In their application they declare that the \$2.10 rate was established from Cincinnati as the result of a misconception which they cannot now explain; that it was intended to be used only as a proportional rate on pig iron coming to Cincinnati from points south of the river, although it was published as a local rate. Now their desire is to limit its application to pig iron coming to that crossing of the Ohio River.

A further declaration is that the existence of a local rate of \$2.10 from Cincinnati to that part of Canada that adjoins the Detroit group leads to gross inconsistencies and fourth section violations on pig iron originating at Ashland, Ironton, Wellston and other points on the Ohio River. No explanation is contained in the application as to how there can be violations of the long-and-short-haul clause of the fourth section on a rate applying from Cincinnati, locally, to Ontario points. It is assumed, however, that such violations result from the participation of the Baltimore & Ohio and the Panhandle in rates on pig iron from Portsmouth, Ironton, Jackson and other points in southern Ohio via Columbus to the Ontario destinations.

There have been so many inquiries as to the meaning of the application that the commission is expected to call for more explanation than has been by the petitioners. The declaration that the \$2.46 rate is desired for use as a base for rates "elsewhere" is the one that excites curiosity. The \$2.46 rate applies on pig iron from Ashland-Ironton, Portsmouth, Wellston and Jackson. Its application to Cincinnati is understandable on the ground that uniformity is desirable at Ohio River crossings. It is, however, not understandable on any other ground, unless there are rates from points north of Cincinnati that are considered to be too low in comparison with those from Ashland-Ironton and the other blast furnace points in southern Ohio.

W. L. C.

Nitre Cake for Pickling Steel Sheets

A new use has been found for nitre cake in the steel industry. This is a by-product in the manufacture of commercial nitric acid and before the war was practically of no value. It is an acid sulphate of sodium, NaHSO_4 , produced from treating Chile saltpetre with sulphuric acid to make nitric acid. It contains always a certain amount of free sulphuric acid which varies in amount from 5 to 30 per cent. It is stated that all the available supply is now regularly and eagerly purchased for use in pickling steel sheets and that it acts as a very acceptable substitute for sulphuric acid, which was formerly used for this purpose. A large automobile company is said to be using all it can buy for pickling its sheets.

The plant of the Champion Tool Works Co., Spring Grove Avenue, Cincinnati, has been acquired by the Greaves-Klusman Machine Tool Co., and will be fitted up for the manufacture of lathes. The Champion Tool Works is moving its equipment to a new plant at Winton Place, which it expects to have in operation within the next 60 days.

EMBARGO ON STEEL EXPORTS

All Products, Including Pig Iron, Placed Under Ban By Railroad Committee

A general railroad embargo on shipments of pig iron and steel products to seaboard for export went into effect last Friday. This is the first step following the pooling of Eastern railroads to work out a solution of the present demoralized condition of freight transportation. The embargo will probably last as long as is necessary to relieve the congestion at seaboard terminals, and it will work no hardship to our Allies because there is already at seaboard more freight for shipment abroad than there are ships to carry it.

Announcement is made of the formation of a committee of railroad executives, which will have its headquarters at 165 Broadway, New York, adjoining the offices of representatives of the allied governments, and the two offices will keep in close touch. The committee will, of course, work in close co-operation with the Railroads War Board, with headquarters in Washington.

The first action of the committee affected pig iron and steel because of the importance of these products in the war program and the necessity of keeping such supplies moving to domestic users.

George D. Ogden, freight traffic manager of the Pennsylvania System, is chairman of the committee. The men have all been relieved from duty by their respective roads to devote their whole time to the export problem. The first formal meeting of the committee was held Tuesday, after which a statement was issued which said:

The first steps toward the organization of a committee to assume charge of the overseas traffic of the Eastern railroads were taken on Saturday, Dec. 1, at a conference held in the offices of the Trunk Line Association, 143 Liberty Street, New York City. At this conference there were present the representatives in America of the British Ministry of Shipping and the respective agents for the purchase and transportation of military supplies of the Russian and French governments. The Railroads War Board was represented by J. G. Rodgers, general agent of transportation at military headquarters; the lines in official classification territory, by George F. Randolph, commissioner, and the Trunk Line Association, by C. C. McCain, chairman. The following railroads were represented individually by their traffic vice-presidents and other officers: Erie, Pennsylvania, Lehigh Valley, New York Central, Delaware, Lackawanna & Western, Baltimore & Ohio, Central Railroad of New Jersey, Western Maryland, Philadelphia & Reading, Chesapeake & Ohio, Norfolk & Western, New York, New Haven & Hartford, Boston & Albany, and Boston & Maine.

At the preliminary conference the situation was fully explained by Mr. Ogden at the request of the general operating committee of the Eastern railroads, and a unanimous agreement was reached between the representatives of the allied governments and of the various railroad companies. The first duty of the new committee will be to administer the general embargo on export iron and steel, billets, bars, plates, scrap and pig iron (except for the United States Government), which all the Eastern railroads have just been ordered to place in effect at once by the general operating committee at Pittsburgh. Assumption of jurisdiction over the other forms of export traffic will follow.

The necessity for embarking export traffic in the iron and steel products specified resulted from the great accumulation of these products which the railroads have delivered at the North Atlantic ports, and which are now stored on the ground or in cars and are immediately available for export.

The Eastern railroads have thus furnished more transportation service of this character than can be utilized at the time, it was felt, in view of the scarcity of coal and coke in many parts of the United States, and the resulting serious curtailment of industrial production, particularly in western Pennsylvania and Ohio.

The union molders in Cleveland, have decided to demand an increase in wages from \$4.50 to \$6 a day, and an 8-hr. instead of a 9-hr. day. Their present wage agreement with their employers expires Jan. 1.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has been allotted \$1,625,000 of its \$2,725,000 subscription to the second Liberty Loan.

IMPORTANT COURT RULINGS

Review of Late Decisions Specially Affecting Dealers and Manufacturers

BY A. L. H. STREET

Securing Past Due Accounts in Conditional Sale Contracts.—The right of a seller of machinery under a contract reserving title in himself until payment of the price to extend the security to pre-existing indebtedness of the buyer on open account is recognized by the Washington Supreme Court in the case of *Union Machinery & Supply Co. vs. Thompson*, 167 Pacific Reporter, 95, decided Aug. 29, 1917. In this case two donkey engines were sold under a written contract contained on plaintiff's regular printed form, which contained conditions to the effect that the seller might apply payments either upon the particular contract, any other conditional sale contract of the buyer, or open account due from him; and that title to the engines should remain in the seller until payment of the agreed price, "and all other sums due." When defendant offered to pay the last installment due on the price of the engines, demanding release of the seller's title, there was a balance of \$24.90 due on open account. On his refusal to pay this, release of the contract was refused and the engines were replevied by the plaintiff seller. The court upholds the plaintiff's right to reclaim them, under the terms of the contract. It is decided that, as between buyer and seller, they may validly contract that a conditional sale contract shall secure past due and previously unsecured accounts, as well as payment for the property sold under the contract. But the court specially notes that such an agreement might not be valid as against the rights of third parties.

Delivering Railway Company as Warehouseman.—While in custody of freight for the purposes of transportation a railway company is under strict legal responsibility for its safety, being liable for loss of or injury to the goods in the course of transit without proof of negligence, excepting as against losses caused by act of God and certain other unpreventable causes. But after reasonable opportunity has been afforded the consignee to remove the goods on their arrival, this strict responsibility ceases and the railway company becomes a mere warehouseman, who is not liable for injury to goods in his keeping except as he may have been negligent or may have specially insured the safety of the property. This interesting and important distinction was involved in the recent case of *United Metals Selling Co. vs. Pryor et al.*, receivers of the Wabash Railroad, decided July 9, 1917, by the United States Circuit Court of Appeals, Eighth Circuit (243 Federal Reporter, 91). Delivery of a carload of copper ingots was delayed because the consignee's private switch track was crowded with other cars, and the particular car was placed upon a connecting sidetrack, to await switching to the private track. The consignee was duly notified that the car was at its disposition, subject to demurrage charges. The carrier's published tariffs specified that in cases of this kind delivery should be deemed to be made on tender of cars to the consignee, and the bill of lading provided for storage with liability as warehouseman on the consignee's failure to unload within 48 hours. Six days after the car arrived the consignee paid accrued demurrage charges and the shipment was switched to its private track. One of the seals had been broken and part of the copper had been stolen, although the seals had been found to be intact the night before. The court finds from these facts that the railway company's relation to the shipment as common carrier had ceased before the loss occurred, and that the company's continued custody was that of a mere warehouseman. Hence, in the absence of proof that the loss resulted from any negligence on its part, there was no right of recovery against the railway company.

Manufacturing Establishments as Disturbers of the Peace.—One who settled in a neighborhood of a small city before any factories were established there is en-

titled to enjoin a manufacturer of iron and steel products who afterward established a plant near his dwelling house, from unnecessarily occasioning him discomfort by carrying on work outdoors; by leaving windows and doors of the factory open while carrying on such noisy operations as riveting, hammering, etc.; by carrying on such work in a corrugated iron building, thereby intensifying the noise; and by continuing the work late into the night. Legitimate business should not be hampered; it should be encouraged; but all reasonable means of avoiding unnecessary annoyance to residents of the locality must be adopted. The employment of more men during usual working hours would obviate night work, and the erection of proper buildings, with skylights, would largely do away with other objections. In assessing damages in a case of this kind, diminution in the rental value of property, resulting from the annoyances complained of, is usually the proper measure of recovery, so far as injury to the property is concerned. (New York Supreme Court, Niagara Equity Term; July, 1917. *Eron vs. Niagara Steel Finishing Co.*, 166 New York Supplement, 442.)

Scope of Company Manager's Powers.—One in charge of a business corporation's commercial affairs has implied authority to bind the company by all transactions entered into by him with third persons on the part of the company, so far as the same are within the general usage, practice, and course of the enterprise in which the corporation is engaged, except as such third persons may know of specific limitations on the manager's actual authority. Hence the manager of an iron works company could validly sell supplies previously delivered at an ice plant, although they might have been so delivered in the first instance for storage only. (California District Court of Appeal, July 30, 1917. *Cyclops Iron Works vs. Chico Ice & Cold Storage Co.*, 166 Pacific Reporter, 821.)

Compensating Corporate Officers.—If regularly employed, the director of a corporation may serve in the independent capacity of an officer or employee of the company and receive separate compensation in that capacity. But a vote by a board of directors of excessive salaries to certain of its members, who are also officers or employees of the corporation, even though subsequently ratified at a stockholders' meeting, is reviewable in the courts at the instance of minority shareholders. If a court finds that the salaries are excessive, reasonable compensation may be decreed and the corporation be restrained from paying more. (Pennsylvania Supreme Court, April 16, 1917. *Sotter vs. Coatesville Boiler Works*, 101 Atlantic Reporter, 744.)

Licensing Junk Dealers.—The Maryland statute which imposes an annual license tax of \$30 a year against junk dealers in cities or counties of 50,000 population or more, \$20 where the population is between 10,000 and 50,000, \$10 in less populous communities, and \$250 in Baltimore City, is valid. Being a tax upon an occupation, and not against property, the provision does not infringe a constitutional guaranty of taxation of property according to value. And the legislature acted within its rights in making the classification upon which the license tax is graduated. The imposition of the highest tax in Baltimore must be presumed to have been fixed with reference to the fact that in a large city specially close police supervision is required to minimize opportunities for the disposition of stolen property. Nor is the law invalid for failure to define "Junk dealing," a distinct and well recognized branch of commercial enterprise, consisting in dealing in old iron or other metal, glass, paper, cordage or other waste or discarded material, which may be treated or prepared so as to be used again in some form. (Maryland Court of Appeals, June 27, 1917. *State vs. Shapiro*, 101 Atlantic Reporter, 703.)

The Griffin Wheel Co., St. Paul, Minn., is building an addition to its office building, which will include an emergency hospital for employees. Office employees will be trained in first-aid treatment. C. H. Fogelberg is manager of the plant.

CAST-IRON BRIQUETTES

Test Data on Foundry Products Using Borings

RESULTS obtained from a series of tests to determine the effect of using briquetted cast-iron borings in the cupola charge on the physical and chemical properties of foundry products, and run with the cooperation of the Southwark Foundry & Machine Co., and the Baldwin Locomotive Works in May of this year by Thomas Gilmore, Jr., chief engineer, General Briquetting Co., New York, were discussed by A. L. Stillman, also of that company, in a paper presented before the American Foundrymen's Association in Boston, Sept. 25.

The cast-iron borings from which the briquettes were made in a Ronay press were medium cut assorted borings made at the foundry of the Baldwin Locomotive Works. The briquettes made were 5 in. in diameter and came out uniformly between 7 and 8 in. high, weighing about 28 lb. each. The density was about 80 per cent the normal density of iron. Two series of tests, one on a mixture for miscellaneous castings and the other on a locomotive cylinder mixture were made. In loading the charge, the briquettes were put on top so that they would not be subject to heavy impact in charging. The melting was satisfactory and proceeded along regular lines. The briquettes melted evenly from the outside. Tests from each of the mixtures were subjected to deflection, transverse and tensile tests. Each test piece was analyzed for combined carbon, manganese, sulphur and silicon. The analyses are as follows:

Analyses of Casts			
Combined Carbon	Manganese	Sulphur	Silicon
Per Cent	Per Cent	Per Cent	Per Cent
Regular miscel. mixture...	0.56	0.83	0.061
Miscel. mixture No. 1...	0.61	0.60	0.093
Miscel. mixture No. 2...	0.62	0.90	0.084
Miscel. mixture No. 3...	0.69	0.62	0.087
Regular cylinder mixture	0.69	0.39	0.106
Cylinder mixture No. 1...	0.77	0.34	0.108
Cylinder mixture No. 2...	1.04	0.38	0.103
Cylinder mixture No. 3...	1.32	0.23	0.097
			1.15

The table, he pointed out, shows a perceptible increase in the combined carbon. The free carbon, not shown in the analysis, is considered partly liberated and partly taken up in combination in the melt. This, he said, contributes better structure and stronger iron and may be considered as a benefit due solely to the use of briquettes. The manganese determination he believes not sufficiently definite to warrant any conclusion, although there is a diminution presumably due to oxidation. On the other hand, there is a slight increase in sulphur in the miscellaneous mixture and strangely enough a decrease in sulphur in the cylinder mixture. The increase in sulphur means a more finely granulated structure and in cylinder work would give good service. The decrease in silicon is marked more in the miscellaneous casting than in the cylinder iron. This decrease, he said, has a tendency to produce harder metals. In the test pieces, and especially in the cylinder mixture, a progressive increase in depth of chill was shown, the lowest being the regular mixture and the highest the No. 3 test piece. From the foundrymen's point of view, considering the work for which the iron was designed, he held that the mixtures containing briquettes were as good if not better adapted to that work than the regular mixtures used.

Results of Physical Tests

The transverse tests on the test pieces made resulted as shown in the table. In all cases the deflection at 1000 lb. was the same and there is little difference at 2000 lb., and though mixture No. 3, in each case, shows a greater deflection at 3000 lb. than does the regular mixture, he does not consider this enough to draw a definite conclusion. The rupture in his judgment indicates that the use of briquettes had increased the resistance of the iron progressively in proportion as the briquettes were used, there being a difference of 600 lb. at rupture between the regular mixture and mixture No. 3. On the other hand, the cylinder mixture shows a decrease under the same con-

ditions, although, he pointed out, the average breakage point of the three test pieces is 3930 lb., while that of the regular mixture was 4000 lb., a difference he considers of no great moment.

The results of tensile tests are shown in a table. With the exception of miscellaneous iron test piece No. 2, which failed under comparatively light load, the result was uniform and, he said, indicates, so far as tensile resistance is concerned in these mixtures, that the use of briquettes has little influence one way or the other. He concludes that briquettes of cast iron have a definite and promising future in foundry practice, and that they in no way injure the resulting melt and that their use results in economy.

Materials Used in Test Mixtures
CAST IRON FOR MISCELLANEOUS CASTINGS

	Briquettes		Scrap		Pig Iron		Total Weight of Charge
	Per Lb.	Per Cent	Per Lb.	Per Cent	Per Lb.	Per Cent	
Regular mixture			1,800	60	1,200	40	3,000
Mixture No. 1	300	10	1,800	60	900	30	3,000
Mixture No. 2	300	10	1,500	50	1,200	40	3,000
Mixture No. 3	600	20	1,500	50	900	30	3,000

The analysis of the pig iron was as follows: Silicon, 2.6 per cent; phosphorus, 0.08 per cent; and sulphur, 0.03 per cent. The scrap was mostly foreign material; the analysis of this material can be assumed as: Silicon, 1.8 per cent; phosphorus, 0.7 per cent; and sulphur, 0.09 per cent.

CAST IRON FOR LOCOMOTIVE CYLINDERS

	Briquettes		Scrap		Car Wheels		Pig Iron of Charge
	Per Lb.	Per Cent	Per Lb.	Per Cent	Per Lb.	Per Cent	
Reg. cyl. mix.			1,500	50	300	10	1,200
Mix. No. 1	300	10	1,500	50	300	10	900
Mix. No. 2	300	10	1,200	40	300	10	1,200
Mix. No. 3	600	20	1,200	40	300	10	900

Hard and dense West Virginia coke containing 0.8 to 1 per cent sulphur was used. One part of coke to 8 or 9 parts of iron was used. The inside diameter of the cupola was 54 in. and the melting capacity was about 15,000 lb. per hr.

Results of Transverse Tests

	Diam. In.	Deflection at			Rupture Lb.
		1000 Lb.	2000 Lb.	3000 Lb.	
Miscel. iron, reg. mix.	1.29	0.05	0.09	0.10	3,000
Miscel. iron, No. 1	1.29	0.05	0.09	0.11	3,400
Miscel. iron, No. 2	1.31	0.05	0.085	0.10	3,550
Miscel. iron, No. 3	1.284	0.05	0.09	0.11	3,600
Cyl. iron, reg. mix.	1.291	0.05	0.09	0.11	4,000
Cyl. iron, No. 1	1.338	0.04	0.08	0.10	4,400
Cyl. iron, No. 2	1.281	0.05	0.085	0.11	3,700
Cyl. iron, No. 3	1.28	0.06	0.09	0.12	3,700

Results of Tensile Tests

	Diam. In.	Area Sq. In.	Breaking Strength Lb.		Stress Lb. Per Sq. In.
			Per Lb.	Per Sq. In.	
Miscel. iron, reg. mix.	0.786	0.485	15,100		31,140
Miscel. iron, No. 1	0.792	0.493	15,300		31,030
Miscel. iron, No. 2	0.805	0.509	12,100		23,770
Miscel. iron, No. 3	0.763	0.457	14,100		30,850
Cyl. iron, reg. mix.	0.744	0.435	14,300		32,880
Cyl. iron, No. 1	0.795	0.496	18,700		37,700
Cyl. iron, No. 2	0.776	0.473	16,700		35,310
Cyl. iron, No. 3	0.778	0.472	15,600		32,840

Magnesite Production in 1916

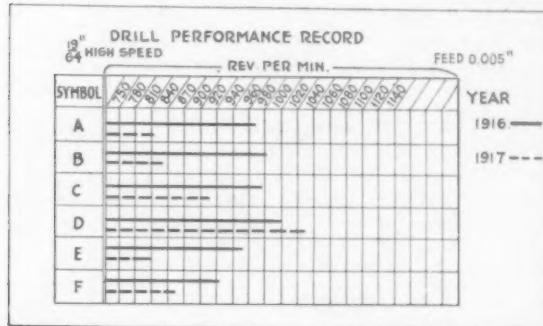
Normally about 6 lb. of magnesite was formerly used for every ton of steel made by the basic open-hearth process, but now not more than $\frac{1}{2}$ lb. is used, and at some steel plants cheaper and less satisfactory refractories have been substituted, says Hoyt S. Gale in a U. S. Geological Survey Bulletin 666-BB on "Magnesite." More raw magnesite was produced in the United States in 1916 than ever before. Last year's output was 158,759 net tons as compared with 30,499 tons in 1915 and 9632 tons in 1913. Imports for consumption of the raw mineral were 75,345 tons in 1916, also exceeding any previous record, but the imports of calcined magnesite were only 9270 tons as compared with 167,094 tons in 1913. The total consumption calculated as calcined mineral in 1916 was 126,322 tons as compared with 66,706 tons in 1915 and 178,530 tons in 1913.

The Victor Talking Machine Co., Camden, N. J., has advanced the wages of all employees at its works receiving less than \$30 weekly 10 per cent. This makes a total wage advance at the Victor plant of 36.4 per cent since the commencement of the war.

CORRESPONDENCE

Difference in High-Speed Drills

To the Editor:—The difference in the performance of high-speed drills is much greater to-day than a year ago, according to our own records. At that time the records show a very small margin in the failure point of six certain makes, designated as A, B, C, D, E and F. We cannot say that of these same drills that we are



buying now. We have eight specific cases to show that it is the drills and not hard castings, as we at first thought, and also that the average variation in the speed in relation to the size is practically the same.

One of these cases is drilling six holes, 19/64 in. in diameter and 4 in. deep, in cast iron 18 per cent steel:

Drill	Failing Speed, R.p.m.		Failing Speed, R.p.m.	
	A	B	C	D
A	810			1,130
B	825			809
C	915			850

In everyday use we are running 4-in. holes at 996 r.p.m., with 0.005-in. feed, and get 84 holes of these between drill grindings and consider this good results. It has been suggested that we run the other drills too fast. We do, but don't see any reason why the speed should be reduced to accommodate an inferior tool as long as good drills are available, especially at same price.

H. M. FITZ.

Davenport, Iowa.

Group Insurance and the Labor Turnover

To the Editor:—Owing to the many employers studying methods for decreasing labor turnover and increasing production, the following description of the group insurance in use at the Cincinnati Planer Co. should be worth while. When this proposition was offered by the insurance companies the first question was, "What good is it?" The answer was this: "It will decrease the labor turnover, and at the same time you will get greater and better production from the employees." This insurance, being in use only since October, 1917, it is too early to state positively whether these results will be forthcoming. It will be easy enough to tell if the labor turnover decreases. If it does, group insurance will be credited with its share of the improvement. If carefully studied, the value in dollars and cents can be closely estimated. If the labor turnover is low, or improving, and production is high or improving, group insurance will be credited accordingly, in proportion to its share. It would be a mistake to say

that turnover or production is entirely controlled by any one factor, but if a satisfactory improvement can be shown the money will be considered well spent. The average cost of this insurance is about \$1 per year per employee (less than 2 cents per day), depending upon age and length of service of the 600 employees covered. It is hard to figure this as a losing proposition. It is almost sure to pay for itself.

A letter was typewritten on the regular company letter head, made up neatly, plain, short and with the idea of conveying a personal touch directly from the manager to the home, thereby making a good impression on that powerful factor in human engineering, namely home influence. The letter was written in plain machine shop English, and mailed on a Friday so that it would be received on a Saturday, which was considered a psychological time, giving the family an opportune time to talk it over on Saturday and Sunday.

In the employment department an immediate increase in the number of applications was noticeable. It can be seen that here is a good talking point for the employment manager and also for superintendent, foremen, etc. Any employee who is indifferent to this plan would best be discharged from the organization.

One part of this proposition which received considerable study was the question of whether this insurance should be based on wages or length of service. It was decided that the latter plan was the simplest and most efficient, for several reasons. In the first place, sooner or later many machine shops will adopt group insurance and if it is based on wages there will be nothing to hold the employee. As long as employees can change from one shop to another without an actual direct personal loss, they will do so in spite of increased wages, welfare work or almost anything else. If two shops in same locality both have insurance based on income, an employee insured for say \$1,000 would have no incentive for remaining with the old organization if he could get the same insurance in the new shop. However, it is understood that a certain percentage of employees are not inclined to change as long as they get good pay and a square deal. If all employees were of this class insurance would be unnecessary and instead a higher rate of pay would be more effective. Another advantage in basing insurance on length of service is that it is very simple and leaves no room for doubt. Insurance based on wages would require considerable figuring in these days of premium, piecework, bonuses and so forth. It would also probably create dissatisfaction among some employees after policy comparisons are made and John finds Bill "is making more money 'cause his insurance is bigger."

The work required in connection with this insurance is very simple, and requires very little time, say about two hours a week. A record card giving a complete record of each employee must be filled out, stating name in full of company and employee, birthday, address, beneficiary, etc. After this is filled out no work is required unless the employee leaves the service or dies, excepting checking of invoices and reports, which has been boiled down to a simple system.

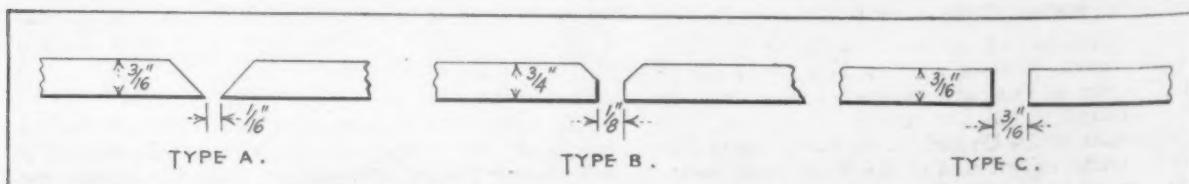
Cincinnati.

C. J. SCHNEIDER.

Influence of Current on Arc Welds

To the Editor:—I was much interested in the extract of Mr. Wilson's remarks on arc welding presented to you by Myron F. Hill, in THE IRON AGE of Nov. 8. Although we agree in many things, there is one point on which our experience seems to differ widely.

To study the effect of current on the strength of



Diagrams to Illustrate Effect of Current on Welding Different Types of Joints

weld and penetration of fusion, I made tests with three types of joints, shown in the illustration, and welded each of these joints with 80, 90, 100, 110, 120 and 130 amperes. The pieces were welded as near flush as possible and machined to the thickness of the plate before pulling. The table gives the results of the tests which were made by the Pittsburgh Testing Laboratories. In the full bevel where the arc played directly on the surface the welds were better than the original material. In the half bevel and square joints

LEICESTER P. SIDNEY, second lieutenant King's Royal Rifles, attached to the Royal Flying Corps, was recently killed in a battle in France. He studied metallurgy in the National Physical Laboratory, Teddington, under Dr. Rosenhain and F. W. Harbord, later serving with the Ebbw Vale Iron, Steel & Coal Co. When the war broke out he was employed by Bell Brothers, Middlesbrough, Eng.

JOHN DICK, aged 59 years, died at his home in Braddock, Pa., Nov. 30. For some years he was foreman of millwrights at the Edgar Thomson Steel Works of the Carnegie Steel Co., and later was head of the mechanical department in the blooming mills in the same plant. In 1892 he was transferred to the Homestead Steel Works of the Carnegie Steel Co., and was connected with that plant at the time of his death.

D. R. LEAN, for many years engaged in the engineering and contracting business for the erection of blast furnaces and steel plants, the firm being known as Lean & Blair, Pittsburgh, died at his home in that city on Thursday, Nov. 29. In his early life Mr. Lean did a large amount of furnace work for the old firm of Carnegie, Kloman & Co.

HENRY GAUL, for about 25 years connected with the Ajax Mfg. Co., Cleveland, died Nov. 19, aged 68 years. He had for many years been in the service department of the company and in that capacity was widely known among forge men in railroad, locomotive car building and industrial forge shops. He was an expert of rare ability.

WILLIAM A. SAXE, of New York, secretary and treasurer of the Standard Concrete Steel Co., was instantly killed Nov. 28 in Baltimore when hit by an automobile driven by a 17-year-old boy. The automobile is said to have skidded in the snow, striking Mr. Saxe while he was standing on the street waiting for a street car.

RICHARD HENNING, president Cream City Boiler Works, Milwaukee, died Nov. 28 at the age of 55 years. Mr. Henning was born in Milwaukee and was one of the founders of the concern of which he was president. His only son, Lawrence, is now serving in the American Expeditionary Forces in France.

HANBURY KEKEWICH, Captain Sussex Yeomanry, son of L. P. Kekewich, and partner in Morrison, Kekewich & Co., metal brokers, London, was recently killed in action. Of Mr. Kekewich's four sons three have now been killed, and the fourth seriously and permanently injured.

ROBERT S. SMITH, aged 57, died at his home in the East End, Pittsburgh, Nov. 30. Mr. Smith was born in Pittsburgh, and was president of the McGinness-Smith Co., the oldest firm of heating and ventilating engineers and contractors in that city.

OBITUARY

WILLIAM D. KEARFOTT, well known as marine engineer and president of Kearfott Engineering Co., New York, died Nov. 12, aged 53 years. He began work with the Morton Poole Co., Wilmington, Del., and prior to the formation of the Kearfott Engineering Co., two years ago, was associated with the International Navigation Co., the Worthington Steam Pump Co. and the Warren Steam Pump Co. Mr. Kearfott's avocation was the study of small moths, of which he possessed a collection said to be the second largest known. He was a resident of Montclair, N. J., and a member of the Machinery Club of New York, the Society of Naval Architects and Marine Engineers, and the American Society of Mechanical Engineers.

JOB T. PUGH, Philadelphia, head of the business of Job T. Pugh, Thirty-first and Ludlow streets, manufacturer of augers and edge tools, died at his home at Swarthmore, Nov. 25, after a month's illness, at the age of 53 years. He was treasurer of the Association of Centenary Firms, and a member of the Manufacturers' Club, Philadelphia. The concern of Job T. Pugh was established by an ancestor in 1774, and is one of the oldest tool-making firms in the world.

ROY A. WILLIAMS of the R. A. & W. M. Williams Co., vessel agents, Cleveland, died Nov. 23, aged 38 years. He was at one time connected with the lake traffic department of the Carnegie Steel Co., and after the organization of the United States Steel Corporation was in the traffic department of the Pittsburgh Steamship Co. several years. He organized the North American Steamship Co. in 1910 and managed the boats of that fleet and other vessels.

WASHINGTON, Dec. 4.—A heavy gain in exports was made in October, the total for the month being \$542,000,000, an increase of \$86,000,000 over September, according to figures compiled by the Bureau of Foreign and Domestic Commerce. The exports for the 10 months ended with October of this year amounted to \$5,149,000,000, as against \$4,443,000,000 for the corresponding period last year.

October imports are placed at \$221,000,000, a falling off of \$15,000,000 compared with September. For the ten-month period ended with October, the imports into the United States were valued at \$2,504,000,000, as compared with \$2,010,000,000 for the first ten months of 1916. Seventy-six per cent of the October imports entered free of duty.

A patent (U. S. 1,231,499) has been granted to Joseph Crossley, Trenton, N. J., for a continuous mixing mill, having special reference to mills for mixing the material used for making pottery vessels such as crucibles. Its object is the reduction in cost and saving in time in preparing the material for the molds.

SPEEDING WAR WORK

Preferential Shipments for Coal, Coke, Steel and Other Necessary Products

WASHINGTON, Dec. 4.—The first definite step of the Government to discriminate between essential and non-essential industries with a view to speeding up war work has just been taken by Fuel Administrator Garfield, who has requested all coal operators east of the Rocky Mountains to establish an order of preference in which coal needs are to be filled. The requests directed to some 5000 producers contemplate preferential shipments for 30 days for Government orders, railway fuel, domestic requirements, public utilities, steel plants, by-product coke ovens, and munition plants. The requests are not in the form of direct orders but, as they are designed to insure the fulfilling of the requirements of those coal users which are essential to the military and economic efficiency of the nation in the conduct of the war, it is expected that the fullest co-operation will be accorded the Government.

Confronted by a coal shortage of 50,000,000 tons, due to an increased consumption of 100,000,000 tons, the fuel administrator took up with the War Industries Board the question of the course to be pursued to insure an adequate supply of fuel for the railroads, the munition plants and other industries necessary to the general welfare of the nation. During the conferences that followed, the suggestion, originally made by the railroad war board, to cut off supplies from non-essential industries was renewed, but was promptly rejected by Dr. Garfield on the ground that it would work unnecessary hardship upon a large class of manufacturers, merchants and consumers, in many cases entailing absolute ruin. The issuance of an order absolutely denying fuel to any specified list of industries would immediately destroy the credit of manufacturers engaged therein and would cripple financially all the concerns employed in the distribution of their products. Believing that the coal shortage will be made up within a few weeks, Dr. Garfield decided that it was the wiser policy to insure a full supply of coal to those industries necessary to the prosecution of the war and for domestic requirements and to permit any surplus to be distributed as heretofore without governmental interference. In this way the dealing of a direct blow at the non-essential industries has been avoided, and it is believed that when the 30-day preferential regulation has expired, the equilibrium between consumption and supply will have been restored to such an extent that few, if any, of the so-called non-essential industries will be seriously affected.

A decided improvement in the fuel situation is looked for as the result of the action taken by Dr. Garfield, and it is believed that a greater measure of relief will be obtained through the voluntary co-operation of the producers than as the result of a drastic peremptory order. Munition plants, especially, will be speeded up under the new system of distribution, and many large concerns now running on half time will be enabled to resume maximum output.

Dr. Garfield's action with respect to coal will soon be supplemented by an order from the priorities committee of the War Industries Board covering preferential treatment of raw materials for munition manufacturers, the railroads, shipyards, etc. This order presumably will cover shipments of iron and steel and other metals, lumber, materials for explosives, etc. The development of the War Industries Board's policy in this regard will probably be progressive and will ultimately grant priority to all products essential to the conduct of the war and to the necessities of life.

President Wilson has approved a recommendation of the fuel administrator for a general increase of 35 cents a ton in the price of anthracite coal at the mines. This increase is designed to meet and absorb a proposed wage increase for anthracite miners and is immediately effective. It is estimated that it will add more than \$30,000,000 annually to the nation's coal bill.

Information received by the fuel administration indicates that the agreement upon a higher price for

anthracite coal has already served to stimulate output and Dr. Garfield expresses the opinion that all necessary requirements, both industrial and domestic, will be reasonably met.

The shortage of coke cars is becoming increasingly severe. During the week ended Oct. 20, the loss attributed to this cause amounted to 8.7 per cent of the rated capacity. In the week ended Nov. 17 the loss was 16.2 per cent.

Steel Fabricators' War Organization

Ninety per cent of the steel structural plants, bridge steel plants and those supplying structural materials for the shipbuilders were represented at the meeting at the William Penn Hotel, Pittsburgh, on Tuesday, Nov. 27, and an organization known as the Steel Fabricators of the United States was formed to offer the Government co-operation during the war, as briefly stated in THE IRON AGE of Nov. 29. A committee was formed to keep the Government posted on the material that is available. C. Edwin Michael of the Virginia Bridge Co., Roanoke, Va., heads the war service committee, which includes the following: John Sterling Deans, Phoenixville Bridge Co., Phoenixville, Pa.; George P. Bard, Petroleum Iron Works, Sharon; Thomas Earle, Bethlehem Steel Bridge Corporation; Howard A. Fitch, Kansas City Structural Steel Co.; J. L. Kimbrough, Indiana Bridge Co., Muncie, Ind.; C. D. Marshall, McClintic-Marshall Co., Pittsburgh; Lewis D. Rights, Shoemaker Co., Pottstown, Pa.; H. A. Wagner, Wisconsin Bridge and Iron Works, Milwaukee. Mr. Michael was chosen permanent president and Mr. Rights, secretary and treasurer of the society. The war service committee as the board of directors. The terms of office will be for the period of the war.

Acquires Cannonsburg Plant

E. W. Edwards, president, Edwards Mfg. Co. and Cincinnati Can Co., Cincinnati, heads a party of capitalists that has acquired the plant of the Cannonsburg Iron & Steel Works, Cannonsburg, Pa. The purchasers will retain the company's old name, will operate under its present charter and will roll sheets as heretofore. While the company will have no official connection with the Edwards Mfg. Co., it is understood that the mill was bought with the idea in view of supplying that company with black and galvanized sheets. About 350 men are employed at the present time at the Cannonsburg plant and it is understood that as soon as equipment can be obtained the capacity of the mill will be increased. There will be no change in the management, J. M. Watson continuing as general manager.

The Electric Furnace in Japan

According to an article in the *Far Eastern Review*, electricity is now coming into use in the manufacture of special steels in Japan. The Wakamatsu Iron Works and the Fujitagumi Steel Works at Kirokawa, Inawashiro, are now equipped for this purpose. The latter plant employs 3000 kw. of electricity and produces chiefly ferrosilicon, and at Osaka Harbor also tungsten and chrome alloys. Some other companies are engaged either in trials or in the manufacture of the special products mentioned. At Yasuki and Yoneko ores prepared from iron sands are being treated in electric furnaces.

The Minneapolis Malleable Foundry Co., Minneapolis, Minn., capital \$100,000, is equipping a plant of 6000 tons yearly capacity and a part of the foundry is now ready to start up. The company is installing power squeezers exclusively and is specializing in light malleable castings for which aluminum match plate patterns are used. Melting and annealing will be with fuel oil exclusively. F. C. Hughes is president of the company and E. W. Williams, secretary and treasurer.

TO RELIEVE SHORTAGE

Committee of Railroad Experts Will Deal with Coal Situation

The general operating committee of the Eastern Railroads has opened offices in the Frick Arcade Building, Pittsburgh. At a recent meeting of this committee further steps were taken to relieve as far as possible the severe coal shortage that now exists in nearly all parts of the country. A sub-committee of railroad experts has been appointed that will sit at Cumberland, Md., and deal directly with the coal situation, which, it is admitted, is restricting the war efforts of the country and is also acting as a depressing factor on business everywhere. This sub-committee is as follows: F. E. Blaser, Baltimore; A. C. Needles, Roanoke, Va.; J. A. Tongue, Chambersburg, Pa.; S. Ennes, Hagerstown, Md., and J. A. Turk, Camden, N. J. This committee will open offices at Cumberland at once and will conduct the work of moving coal as promptly as possible for the following railroad lines, all of which are East, but not including the Pittsburgh terminal territory, and east of Parkersburg, W. Va.: Baltimore & Ohio, Cumberland Valley, Philadelphia & Reading, Pittsburgh & Lake Erie, Western Maryland, Norfolk & Western and the Cumberland & Pennsylvania Railroad.

The sub-committee was instructed to secure information covering the exact transportation situation throughout the territory described, to agree upon and put into effect measures for the immediate relief of congested points, keeping the general committee constantly advised, and to pay particular attention to Government freight and to the movement of raw materials for blast furnaces.

The sub-committee was further directed to agree upon and make recommendations to the general committee when any situation is of such magnitude that it cannot be reached by local treatment.

The general operating committee wishes to advise the public that in placing restrictions on any class of traffic, "proper provision will at all times be made for foodstuffs for human and animal consumption."

Reading Steel Casting Co. Adds an Open-Hearth Furnace

The Reading Steel Casting Co., Reading, Pa., which for some years has been operating a large converter plant, installed recently a 10-ton open-hearth furnace, oil-fired. It is located in a lean-to, 40 x 150 ft., off the main molding floor, which is 70 ft. wide and which was also lengthened 200 ft. Already 350 heats have been made in the furnace and the first heat was tapped in just 60 days from the time the foundation was started. Its installation necessitated additional crane and ladle equipment, railroad sidings, fuel oil and raw material storage as well as an increase to the pattern storage, cleaning equipment and other buildings. The capacity of the foundry has been increased to between 1200 to 1500 tons per month. The four large converters, with a capacity of about 1000 tons of small castings per month, are also in regular continuous operation. One object in installing the open-hearth furnace was to place the company in a position to make both large and small castings. The original converter plant in its entirety was described in *THE IRON AGE*, Sept. 23, 1915.

It is proposed to change the name of East Youngstown, Ohio, where the plants of the Youngstown Sheet & Tube Co. are located, to Campbell in honor of J. A. Campbell, president of that company. The matter will come up at the next meeting of the Council in East Youngstown in January.

Hall blast furnace of the Republic Iron & Steel Co. at Sharon, Pa., has been blown out on account of the coke shortage. It will be relined.

UNDER NAVAL CONTROL

Ships Carrying Munitions Will Be Carefully Protected

WASHINGTON, Dec. 4.—For the protection of ships carrying munitions, iron and steel and other cargoes of war essentials an agreement is being perfected between the United States Shipping Board and the Navy Department under which all American vessels operating in the foreign trade will be placed under the control of the Navy, commanded by naval officers and subjected to strict naval discipline. This agreement, which will probably be promulgated in a few days, is the result of an investigation of conditions prevailing in the trans-Atlantic merchant marine which have made it possible for the German submarines to sink more than one large ship loaded with valuable cargo. The Navy is now ready to supply 750 naval reserve officers every four months for these vessels and to take over their navigation immediately.

Official reports of inquiries recently made indicate that ships loaded with munitions and other valuable cargo are being daily sent to sea, manned in large part by aliens who are not even seamen. Whatever qualifications are required to obtain seamen's certificates appear to be ignored and it is said to be entirely practicable for anyone to purchase or forge them and ship as "able-bodied," presumably to obtain the high wages and the 50 per cent bonus for service in the war zone, which brings the average pay up to \$90 per month, or \$15 more than the pay of sub-junior officers. It is even asserted that some of the finest ocean liners in the world are leaving New York on every voyage dangerously undermanned with crews composed in part of men who have never been to sea before. These conditions are said to be general on the best mail steamers, while on the tankers and freighters they are even worse.

In escaping the submarine peril speed is a vital factor, but, according to official reports, on nearly every ship, except the few transports under naval control, there is impaired engine-room efficiency to which more than one lost vessel is to be attributed. An utter lack of discipline also prevails and this condition has been bolstered by the regulations of the seamen's union. It is said that recently an abandoned ship drill was held on a vessel when passing through the war zone, as required by law and also by the Bureau of War Risk Insurance, but as it happened to be Sunday it was necessary to pay the crew while participating in this drill 40 cents per hour overtime, as required by the union rules. A similar overtime charge was levied by men for assisting a gun crew in passing through the war zone.

The plan of the Navy is to use its own and the Naval Reserve officers and to convert into reserves as many competent merchant officers as possible and to weed out gradually the aliens who at present constitute from 60 to 70 per cent of the crews of our merchant ships. The Shipping Board, which originally opposed the transfer, has become convinced that it is vitally necessary for the protection of ships and cargo, and it is believed the final formalities will be concluded within the coming week. As a part of the compromise agreement that has been reached no change will occur in the pay of sailors or of the conditions of living on shipboard. It is believed that this arrangement will be satisfactory to organized labor.

W. L. C.

Grecian Magnesite Exports in 1916

Magnesite exports of all grades from Greece in 1916 are given as 176,383 tons. Of raw magnesite the United Kingdom took 60,511 tons; the United States, 56,504 tons; France, 24,607 tons; Italy, 3100 tons; the Netherlands, 320 tons. Of the caustic and calcined mineral the United Kingdom took 13,127 tons, the United States 9514 tons, and the Netherlands 730 tons. Of the dead burned grade, the United Kingdom took 3975 tons and France 3462 tons.

WAR CHANGES IN INDUSTRY

A Tariff Commission Inquiry—Getting Germany's Foreign Trade

WASHINGTON, Dec. 4.—A survey of the industries of the United States to determine the extent and the specific causes of their disturbance by the war and the steps that should be taken to reduce this disturbance to a minimum and to restore normal conditions as soon as possible when the war is over is about to be undertaken by the United States Tariff Commission. A preliminary inquiry in the leading industrial and commercial centers is already being made by expert special agents, and for the purpose of receiving information and suggestions from representatives of industry and commerce hearings will be held in this city beginning Dec. 6, when a committee of prominent business men, to be designated by the United States Chamber of Commerce, will appear before the commission at its offices. At later dates representatives of large importing and exporting interests will be heard and will be followed by a number of labor leaders. The commission believes that the information developed at these hearings will assist both private interests and the Government in meeting the present needs of the country and in planning constructively for the future.

The commission will endeavor to ascertain the extent to which normal conditions of supply have been disturbed by the war and what new sources of supply exist, including the character and origin of imports. The inquiry will extend to definite information concerning facts now apparent and tendencies developed in particular lines of industry; new plans and extension of old plans because of war demands; changes in processes and methods due to war conditions; the more or less permanent character of such changes, and the steps to be taken to minimize the demoralizing effect of the enforced return to the more conservative standards of business after a long period of war inflation.

Webb Bill Prospects

It is understood that one of the subjects that will be discussed at the coming hearings is the importance of the early passage by Congress of the Webb bill legalizing combinations of manufacturers and dealers, made for the purpose of expanding our export trade. President Wilson is strongly in favor of the passage of this bill, which he regards as a war measure for the reason that its enactment will assist American manufacturers in retaining after the war business which they have built up during the past three years and in further expanding their export trade. The Webb bill was passed by the House at the special session held last summer, has been favorably reported by the Senate Committee on Interstate Commerce and was made the "unfinished business" of the Senate before the adjournment last October. The measure was opposed in the Senate by a coterie of Senators, led by La Follette of Wisconsin, who declares that the practical effect of its enactment would be to emasculate the Sherman anti-trust law and that, under the guise of promoting foreign trade, it would permit the exploitation of domestic trade in defiance of the provisions of both the Sherman and Clayton anti-trust acts.

The managers of the Webb bill have received a definite promise from President Wilson that he will use his influence without reserve to assist in putting the bill through the Senate. It is an unfortunate circumstance that it was found necessary to amend the measure in the Senate Committee on Interstate Commerce, for although the modifications made are comparatively unimportant they make it necessary to send the bill back

to the House for concurrence, and in all probability this will mean the reference of the diverse provisions of the House and Senate drafts to a Conference Committee for final adjustment. Notwithstanding these complications, however, the managers of the measure confidently predict its final passage during the session just begun.

Not to Copy but to Know Germany

The administration is scrutinizing carefully the German preparations for trade after the war, the details of which are being closely followed by experts in the Bureau of Foreign and Domestic Commerce. Since the war eliminated Germany from world trade, the United States has improved its position in foreign markets in spite of the shipping shortage and other abnormal restrictive factors. Department officials point out that the future development of our foreign trade will depend in part on the loss of Germany's good will in practically all important foreign markets and in part upon American ability to maintain our newly obtained prestige. American business men must not make the mistake of seeing only one side of this situation and thus underestimating the German capacity for securing business when the energy, application and craft with which German business will address itself to the task of regaining favor in markets in which it once prospered.

The Bureau of Foreign and Domestic Commerce has already published an important report on the subject of German foreign trade organization and is now planning to issue a supplemental bulletin about Jan. 1. In order to understand the significance of the information on German trade moves that will be made public from time to time, Secretary Redfield counsels not imitation of, but familiarity with the German theories of foreign trade and the artful and formidable organization that, with Government aid at every turn, has been built up in Germany during the last 20 years to dominate the world's markets. The large correspondence with business men in all parts of the country which the Department of Commerce has developed on this subject during recent months is taken as a clear indication that the American manufacturer is making after-war preparation of his own.

W. L. C.

Norway to Make Electrodes

Carbon and graphite electrodes are to be made in a new plant at Frederick, Norway. The capacity is to be 4000 tons of carbon or 1000 tons of graphite electrodes a year and the works are expected to be in operation by the end of 1917. Carbon electrodes will be the first manufactured. American engineers have been engaged and the machinery is almost exclusively of American manufacture. The plant is to work in co-operation with the Norwegian government. The company will use power from the great waterfall of Sarpsfossen on the Glommen River but, in anticipation of its present plant becoming inadequate, it has purchased the rights to the entire power from the waterfall near Kristiansund.

Pipes of Electrolytic Iron in France

The electric steel works of Bouchayer & Viallet, Grenoble, France, are now manufacturing pipes of large sizes from electrolytic iron. They are 13 ft. long, 3 $\frac{1}{2}$ in. to 7 $\frac{1}{2}$ in. in diameter, and about 1/16 in. thick, and are used for water, steam or compressed air. A tube of electrolytic iron is said to possess the same strength as one of cast iron 20 times as thick.

The Dominion Bridge Co., Montreal, has received another order for 10,000 tons of fabricated steel from the American International Corporation. Some two weeks ago orders from the same source for 40,000 tons were announced.

Machinery Markets and News of the Works

ARSENALS LARGE BUYERS

Government Purchases Heavy for Ordnance Work

International Arms & Fuze Co., Inc., Is Placing Orders Which Will Aggregate \$1,500,000 or More

The Government is buying heavily for its arsenals. The Rock Island Arsenal, Rock Island, Ill., has completed purchases aggregating about \$2,000,000 for the manufacture of 3-in. French hydro-compression guns and is now in the market for equipment to cost at least \$1,500,000 for making 4-ft. 7-in. guns with recoil mechanisms. About 150 lathes are included in the new list. The Watertown Arsenal, Watertown, Mass., and the Watervliet Arsenal, Watervliet, N. Y., continue to buy. The Stone & Webster Engineering Corporation has placed additional orders for American gun repair shops in France.

Purchases of the International Arms & Fuze Co., Inc., Bloomfield, N. J., is placing large orders for lathes and turret lathes for shell work. One machine-tool company is reported to have received an order for 100 26-in. lathes. The purchases will total in value \$1,500,000 or more. A Philadelphia company, which is about to close a shell contract, will, it is reported, need 400 lathes for the work it has planned.

The Standard Ordnance Corporation, Hamilton, Ohio, has issued a large list of tools required for gun work. The Crane Co., Chicago, has placed orders in the East for tools to be used for manufacturing cartridge containers. The International Harvester Co., Chicago, has placed orders in the East. The Dominion Steel Products Co., Brantford, Ont., has bought tools in New York for work on a \$4,000,000 gun mount contract received from the United States Government.

New buying for airplane engine work is not so active, but some buying has been done during the week by the F. B. Stearns Co., Cleveland, which has a Government contract for motors. The Duesenberg Motor Co., Newark, N. J., has received a contract to build 500 Liberty airplane motors. Equipment for the new Duesenberg plant was purchased several months ago.

Dodge Bros., Detroit, have placed additional orders in Cleveland for drilling and milling machines for work on gun recoil mechanisms. Other large orders placed with Cleveland companies include one for \$30,000 from Dayton, Ohio, and one for \$24,000 from a Cleveland manufacturer.

Scarcity of machine tools, especially those needed for gun work, grows more pronounced and the Government is taking more interest in second-hand equipment. A large order of second-hand tools, boxed and ready for shipment to Russia, was held up in New York last week. Export licenses are not being granted for shipment to Russia. Scarcity of motors is a serious factor.

Sales of traveling cranes continue on a large scale. The Federal Shipbuilding Co. has not closed as yet on 20 cranes, for which specifications have been issued. The Milwaukee Electric Crane & Mfg. Co. received an order for several cranes for the new shops of the Erie Forge Co., Erie, Pa. The William Cramp & Sons Ship & Engine Building Co., Philadelphia, has bought six cranes from the Bedford Foundry & Machine Co., Bedford, Ind. The Merchants' Shipbuilding Corporation, Bristol, Pa., has contracted for a 60-ton fitting-out crane with the Heyl & Patterson Co., Pittsburgh. The American Brass Co. has bought four cranes for its Buffalo plant. Other crane orders are reported in the local market reviews.

Locomotive crane business is now thoroughly under Government control and all of the output of the American plants, totaling 108 cranes per month, has been commandeered by the Government until March 1 or possibly later.

Locomotive crane builders have received an inquiry from the Bureau of Supply and Accounts of the Navy Department for 60 locomotive cranes. The order for three hammer-head cranes, to cost more than \$2,000,000, for which bids were recently received, has not yet been placed.

New York

NEW YORK, Dec. 4.

Government requirements, direct or indirect, continue to absorb the attention of the machine-tool trade. Large orders have been placed by the International Arms & Fuze Co., Inc., Bloomfield, N. J., for 6 in. shell work. Purchases will aggregate \$1,500,000 or more. A considerable number of large lathes have been purchased from second-hand dealers because of the inability of builders to make deliveries by next February or March.

The Standard Ordnance Corporation, which is affiliated with the Mosler Safe Co., Hamilton, Ohio, has issued a list of several hundred tools it will buy for its plant in that city, which will manufacture 75 mm. guns for the United States Government.

Large orders for turret and engine lathes have been placed in New England by the Crane Co., Chicago, which has received a Government contract for cartridge containers. The International Harvester Co., Chicago, has also bought a number of new tools in the East.

A great many of the orders of the Rock Island Arsenal at Rock Island, Ill., have come to Eastern plants. It is said that the purchases of the arsenal will total \$2,000,000 for making 3 in. French hydro-compression guns.

The Dominion Steel Products Co., Brantford, Ont., has received a \$4,000,000 contract from the United States Government for gun mounts and has bought new equipment in this market.

Watervliet Arsenal and Watertown Arsenal continue to buy for gun shops.

The Hall Printing Press Co., Dunellen, N. J., which has a contract for printing presses for the Army in France and for boring lathes, is buying a few more tools.

Crane business continues active. A new list of the Federal Shipbuilding Co. is as follows: Two 50-ton, 4-motor cranes and four 5-ton, 3-motor cranes for the machine shop; one 15-ton, 3-motor crane for the forge shop; two 20-ton, 4-motor cranes for the foundry, and two 10-ton double-trolley cranes for the plate and angle shop. These cranes are in addition to 10, for which a list was issued several weeks ago. The Whiting Foundry & Equipment Co. has received an order for three cranes from the Blake & Knowles plant of the Worthington Pump & Machinery Corporation at

East Cambridge, Mass. The Milwaukee Electric Crane & Mfg. Co. was awarded an order for several cranes for the new plant of the Erie Forge Co., Erie, Pa. The General Electric Co. is reported to have closed for a 10-ton, a 20-ton and a 50-ton crane for its West Lynn, Mass., plant. The order for the 50-ton was reported recently as having been taken by the Northern Engineering Co., Detroit. The American Brass Co., Waterbury, Conn., has bought four cranes for its Buffalo factory.

The United States Government has placed an order with the Buffalo Gas Engine Co., Buffalo, for \$50,000 worth of gas engines for shipment to France.

The Duesenberg Motor Co., which has completed a new factory in Newark, N. J., has obtained a contract from the Government for 500 Liberty airplane motors. Its equipment was purchased several months ago.

The Government is unable to find enough new tools to meet demands and is taking a keener interest in second-hand tools. Second-hand dealers have been asked to send lists to Washington of all tools on order for export, except to England, France, Italy and Japan. A large number of tools, boxed and ready for shipment to Russia, have been held up.

A story is going the rounds, which may not be true, but which, nevertheless, illustrates present conditions. A second-hand dealer bought a large planer for \$12,000 and offered it to the Government for \$15,000. The Government purchasing agents thought the price excessive and offered \$13,000. The dealer refused to sell, whereupon the Government agents commandeered the tool and paid \$12,000 for it. The dealer's excessive zeal for profit caused him the loss of \$1,000.

Scarcity of motors is becoming a serious factor. Many of the new plants have been built on the assumption that it would be possible to install individual motor-drive machines. The large motor manufacturers have not been able to meet the tremendous demand for motors and as a result belt-driven machines are being used in many instances where motor-driven would be preferred. There has not been a sufficient demand, however, for belt-driven machines to absorb all supplies, and a New York dealer is now offering 125 heavy duty lathes, 16 to 26 in., swing, belt-driven, for prompt delivery. All of these lathes are new. The beds range from 8 ft. to 18 ft.

Locomotive cranes are now thoroughly under Government control. A committee of which A. C. Brown, vice-president of the Brown Hoisting Machinery Co., Cleveland, is chairman, is handling the business now largely from Washington. The total output of locomotive crane shops in the country is now 108 per month and the Government has taken all that the companies will make until March 1, or possibly later. Several propositions were made to the Government by other companies for manufacturing locomotive cranes, but upon the assurance of the present crane builders that all Government demands would be promptly met no encouragement was given to new proposals. The private contractor will have no chance of placing orders for locomotive cranes unless he is willing to accept delivery some time next spring. Even then his order will be subject to delay if the Government requires more cranes than are now contemplated.

James Shewan & Son, Brooklyn, have had plans prepared for an additional story to their machine shop, foot of Twenty-seventh Street.

Brooks & Co., New York, have been incorporated with a capital of \$12,000 to manufacture metal boxes. S. E. Ferris, E. J. and C. C. Jenkins, 631 Quincy Street, Brooklyn, are the incorporators.

The Leslie-Stevens Co., New York, has been incorporated with a capital of \$10,000 to manufacture electrical goods and general engineering supplies. E. A. Leslie, C. H. Stevens and W. P. Faendler, 618 Eleventh Street, Brooklyn, are the incorporators.

The Way Cleanse Corporation, New York, has been incorporated in Delaware with a capital of \$5,000,000 to manufacture machinery for cleaning streets, car tracks, etc. George V. Reilly, Samuel B. Howard and Arthur W. Britton, 65 Cedar Street, are the incorporators.

Thomas Paulson & Son, Inc., Brooklyn, operating a brass foundry at 97 Second Avenue, has increased its capital from \$30,000 to \$100,000.

The Breeze Air Craft Co., New York, has been incorporated with a capital of \$10,000 to manufacture airplanes. J. A. Previle and A. D. Weekes, Jr., 52 William Street, are the incorporators.

Ira S. Bushey & Sons, operating a shipyard at the foot of Court Street, Brooklyn, will build a one-story shop addition, 35 x 70 ft., on Clinton Street.

Anderson & Jacobsen, 722 Court Street, Brooklyn, operat-

ing a foundry, have had plans prepared for a one-story plant, about 52 x 80 ft., at Hoyt and Fourth streets, to cost \$7,000.

The Wall-Stieh Co., New York, has been incorporated with a capital of \$20,000 to manufacture fountain pens. A. Stieh, J. Wahlheimer and J. Wall, 1739 Seventh Avenue, are the incorporators.

The Federal Resilient Wheel Corporation, New York, has been incorporated with a capital of \$500,000 to manufacture wheels, automobiles and airplanes. J. D. Anglin, Z. W. Commerford and J. Feinbloom, 78 West Eighty-second Street, are the incorporators.

The I. X. L. Machine & Tool Co., 180 Lafayette Street, New York, has increased its capital to \$10,000.

The Bureau of Yards and Docks, Washington, D. C., has had plans prepared for a new power plant at the Brooklyn Navy Yard. It has also taken bids for the construction of a new shipbuilding yard to cost about \$300,000.

The Fidelity Metal Co., 196 Diamond Street, Brooklyn, has increased its capital from \$50,000 to \$250,000.

Mason & Moore, New York, has been incorporated with a capital of \$100,000 to manufacture printing and bookbinding machinery. G. Chapman, W. A. Moore and W. O. Mason, 51 Chambers Street, are the incorporators.

The American Machine & Foundry Co., Fifty-sixth Street and Second Avenue, Brooklyn, will build a new five-story and basement plant, 100 x 185 ft., on Fifty-fifth Street, to cost about \$250,000. Contracts have been awarded.

The Bradley-Ellis Motor Co., New York, has been incorporated in Delaware with capital of \$200,000 to manufacture automobiles. C. M. Bradley, James B. Ellis and Harold Nicolai, all of New York, are the incorporators.

The M. J. Wohl Co., 211 Fulton Street, Brooklyn, has been incorporated with capital of \$30,000 to manufacture electrical specialties. M. J. Wohl, M. and B. Mayer are the incorporators.

E. D. Giberson & Co., New York, have been incorporated with a capital of \$50,000 to manufacture iron and steel products. The incorporators are E. D. and M. F. Giberson and R. D. Whiting, 370 Wadsworth Avenue.

The Edison Electric Appliance Co., New York, has been incorporated with a capital of \$2,650,000 to manufacture electrical specialties. C. E. Patterson, H. C. Houck and A. H. Jackson, Schenectady, N. Y., are the incorporators.

The Shavelight Corporation, New York, has been incorporated with a capital of \$10,000 to manufacture special razors. C. G. Campbell, F. J. Kent and S. S. Newton, 21 Cortlandt Street, are the incorporators.

The Presto Snap Fastener Co., New York, has been incorporated with a capital of \$10,000 to manufacture metal fasteners. H. Perlman and R. Hirshman, 110 West 114th Street, are the incorporators.

The High Speed Tools Corporation, 71 Broadway, New York, has been reorganized with a capital of \$100,000.

The Commercial Research Co., 18 East Forty-first Street, New York, manufacturer of platinum goods, has acquired about 248 x 315 ft. on Myrtle Avenue, Flushing, L. I., adjoining its works, for expansion. Byron E. Eldred is president.

Kahn Brothers, 785 Humboldt Street, Brooklyn, are building a one-story addition, 145 x 240 ft., to their metal works to cost about \$18,000.

The Alloy Foundry & Machine Co., New Rochelle, N. Y., has been incorporated with a capital of \$10,000. A. C. Waking, G. C. Pansegrouw and W. E. Wollheim, 2467 Valentine Avenue, are the incorporators.

Otto P. Weismann, Inc., Mt. Vernon, N. Y., has been incorporated with a capital of \$50,000 to manufacture precision thermometers, etc. M. Hertz, H. Weismann and E. K. Noll, 44 Court Street, Brooklyn, are the incorporators.

A new one-story power plant, 60 x 70 ft., will be constructed by the American Smelting & Refining Co. at its works at Maurer, near Perth Amboy, N. J.

The Edison Storage Battery Co., Valley Road, West Orange, N. J., has increased its capital from \$3,500,000 to \$5,000,000.

The Sprague Electric Works of the General Electric Co., Watseking, Bloomfield, N. J., manufacturer of motors, etc., will build a one-story addition, 52 x 100 ft., to cost about \$10,000.

The R. S. Christie Co., operating a foundry at 150 Broadway, Elizabeth, N. J., has been incorporated with a capital of \$50,000 to manufacture anvils, castings, etc. Robert S.

Christie and James S. Ramsay, Elizabeth, are the incorporators.

The National Lock Washer Co., 65 Johnson Street, Newark, N. J., has filed plans for alterations and extensions to its machine shop.

The L. M. Simmonds Co., Newark, has been incorporated with a capital of \$25,000 to manufacture jewelry. S. D. MacPherson, D. F. Sherman and James F. Dempster, all of Providence, R. I., are the incorporators.

The American Can Co., 120 Broadway, New York, has awarded a contract for the construction of its new plant on Elizabeth Avenue, Newark, to the American Concrete Steel Co., 27 Clinton Street, Newark. The proposed works are estimated to cost over \$500,000 and will consist of a three-story factory, 100 x 240 ft.; one-story forge shop, and two-story office building. Excavation work is now under way and the contract calls for completion by April 1. It is said that the new plant will give employment to about 400.

The Hudson County Boulevard Commission, Jersey City, N. J., is planning for the extension and improvement of the county electric power plant at Snake Hill, including the installation of considerable new equipment, at a cost of about \$150,000.

William Ames & Co., Communipaw Avenue, Jersey City, manufacturers of railroad spikes, bolts, etc., are having plans prepared for the erection of a three-story addition, 50 x 125 ft., at Communipaw Avenue and Woodward Street, at a cost of \$10,000.

The Co-operative Engineering Co., 239 Washington Street, Jersey City, has been incorporated with a capital of \$100,000 to manufacture special machinery. Herbert C. Gilson, Jersey City, Claude Smith, 140 West 104th Street, New York, and Edward d'Amour, 2307 Avenue D, Brooklyn, N. Y., are the incorporators.

The Turner Automatic Fan & Mfg. Co., Jersey City, has been incorporated with a capital of \$125,000. George W. Turner, James P. Strickland and Archie V. Jones, Jersey City, are the incorporators.

Catalogs Wanted

The American Sales Co., 311 West Fifty-ninth Street, New York, desires catalogs, specifications, data and prices of large presses suitable for the stamping of pressed steel brake drums and full steel wheels for automobiles and motor trucks. Blueprints will be furnished. Also machines and equipment for the manufacture of triangular files.

New England

BOSTON, Dec. 3.

While there is little new demand for machine tools originating in New England, the volume of orders coming to makers from other sections is pushing deliveries far into the distant future. Virtually all the demand is for machinery for war industries and only A-1 priorities can be given any assurance of delivery in the near future. There is much pessimism in regard to the effect of the next draft. Government pressure for machine tools is so great that the labor shortage, which is compelling many plants to operate much below capacity, is the chief topic of discussion at every gathering of employers. Many plants are planning to employ women workers but definite steps in that direction are few, most manufacturers seeming to be awaiting more definite knowledge of the working out of the new draft plan.

Munitions plants are adding largely to their working forces and tool making shops are receiving greatly increased inquiries and orders. Manufacturers of drills, reamers, milling cutters and similar tools are getting further behind on deliveries, the average time set on orders for drills now being about eight months' delivery. It is still possible to get prompt delivery on some kinds of small machine tools but large tools are so scarce that almost any second-hand machine tool of the larger sizes brings a fabulous price. A weeding out of enemy alien help is going on all over this section, particularly in the Connecticut factories and this is affecting the supply of unskilled labor to some degree.

The United States Machine Co., Boston, has been incorporated, with authorized capital stock of \$500,000, to manufacture firearms.

The Norwood Brass & Aluminum Co., Norwood, Mass., has been incorporated with authorized capital stock of \$10,000. Arthur J. Brissette is president and treasurer.

The United States Airplane & Engine Co., Bridgeport, Conn., has abandoned its plan to erect a plant in Bridgeport and has purchased the old Yale & Towne factory, Branford, Conn., which will be altered to suit the plans of the new owners.

The Metal Specialty Co., New Britain, Conn., has bought the equipment and contracts of the A. S. Ford Co., Bristol,

Conn., and has removed the machinery to its New Britain plant.

The Eagle Pocket Knife Co., New Haven, Conn., has increased its capital stock from \$12,000 to \$25,000.

The Economy Ignition Co., Springfield, Mass., has been incorporated with authorized capital stock of \$50,000. Lewis J. Tetlow is president and treasurer; John T. Glancey and Wilson Goodrich, directors.

The Burgess Co., Gregory Street, Marblehead, Mass., manufacturer of hydroplanes, is building a two-story machine shop addition at its works.

Dutee W. Flint, Allen Avenue, Providence, R. I., operating an automobile plant, will build a new two-story and basement factory, 100 x 150 ft., at Bridgeport, Conn., to cost about \$10,000.

Buffalo

BUFFALO, Dec. 3.

The Crucible Steel Co. of America, 104 Magnolia Avenue, Syracuse, N. Y., has completed plans for the erection of two additions to its works on Emerson Avenue.

The Oneida Textile Co., Fultonville, N. Y., has been incorporated with a capital of \$50,000 to manufacture textile machinery. E. Van Brocklin, J. M. and E. J. Bennett, Fultonville, are the incorporators.

The Craviver Foundry Co., Rochester, N. Y., has been incorporated with a nominal capital of \$5,000. J. T. Craviver, L. C. Graves and T. Hanlon, Jr., are the incorporators.

The Trebert Airplane Motor Co., Rochester, has been incorporated with a capital of \$25,000 to manufacture airplane motors, etc. E. W. Cummings, J. S. Poyen and H. L. F. Trebert, Rochester, are the incorporators.

The Auto Body & Demountable Top Co., Buffalo, has been incorporated with a capital of \$10,000 to manufacture automobile bodies and allied specialties. C. F. Otto, E. Lindner and E. Friedfeld, Buffalo, are the incorporators.

The Erie Aircraft Co., Erie, Pa., has been incorporated with a capital of \$25,000 to manufacture airplanes. George Minnig, Erie, is the principal incorporator.

The American Sterilizer Co., Twelfth and Plum streets, Erie, Pa., manufacturer of scientific instruments, will build a one-story addition, 50 x 70 ft., to cost about \$10,000.

The Howes Co., Silver Creek, N. Y., capitalized at \$250,000, has been incorporated to manufacture machinery and tools. A. C. M. L. and M. A. Barbau are the incorporators.

An addition to cost \$30,000 is to be made to the shops of the Erie Railroad at Rochester.

The Commonsense Mfg. Co., Buffalo, is building an addition to its plant at Niagara Street and West Delavan Avenue for repairing and shipping machinery and metals.

Philadelphia

PHILADELPHIA, Dec. 4.

Crane business in this territory is active. The William Cramp & Sons Ship & Engine Building Co. has closed with the Bedford Foundry & Machine Co., Bedford, Ind., for six small cranes and has issued another inquiry for four 7½-ton and one 20-ton cranes.

The Merchants Shipbuilding Corporation, Bristol, Pa., has ordered a special 60-ton fitting-out crane from the Heyl & Patterson Co., Pittsburgh, through J. N. Kinney, New York. This crane will be used for placing masts in vessels.

War work is the cause of practically all machine-tool demand in this market. The Baldwin Locomotive Works will be a large buyer for shell work. Its requirements of lathes, it is reported, will number about 400.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, is planning for the erection of a one-story addition to its brass foundry, about 143 x 143 ft., at Adams and Thompson streets.

The Economy Service Corporation, Philadelphia, has been incorporated in Delaware with capital of \$300,000 to manufacture fireless cookers, etc. Wray C. Arnold and M. Elliott, Philadelphia, are the incorporators.

The Wright Roller Bearing Co., Spring City, Pa., has commenced the removal of its works to property recently acquired at Twentieth Street and Indiana Avenue, Philadelphia, and is planning for an increase in its former capacity.

The United States Jack Co., Philadelphia, has been incorporated in Delaware with a capital of \$60,000 to manufacture jacks and other lifting apparatus. F. R. Hansell, Philadelphia, and S. C. Seymour, Camden, N. J., are the incorporators.

M. L. Bayard & Co., Philadelphia, will make improvements and alterations in their machine shop at Twentieth Street and Indiana Avenue to cost about \$5,000.

The National Galvanizing Co., Philadelphia, has acquired property at 1609-13 North Front Street, about 51 x 110 ft. for its works.

The Camden Auto Radiator Repair Co., 507 Arch Street, Philadelphia, will build a two-story extension to its works, about 20 x 45 ft.

The Aluminum Brazing Co., Chester, Pa., has had plans prepared for the construction of a one-story addition to its plant, 35 x 60 ft., at Third and Tilghman streets.

The Mahoning Foundry & Machine Co., Punxsutawney, Pa., has been incorporated with a capital of \$30,000. V. A. Gillespie is the principal incorporator.

The Pressed Steel Co., North Penn Avenue, Wilkes-Barre, Pa., will build a one-story, concrete addition to its plant, about 40 x 60 ft.

The Keystone Automobile & Machine Co., Latrobe, Pa., has been incorporated with a capital of \$15,000 to operate a machine works. Benjamin Ratner is the principal incorporator.

The Benjamin Iron & Steel Co., Hazelton, Pa., is operating in its new works, recently erected on the site of the Hazelton sheet steel plant. The plant will be used for the production of mine cars, boilers and other equipment for coal mines.

Harris Brothers, Chicago, have acquired the machine repair shops of H. S. Kerbaugh, Inc., Bellwood, Pa., and will establish works to specialize in the repair of locomotives and kindred equipment. It is planned to commence operations Dec. 15. About 100 will be employed.

Arnold Brothers, Inc., Ridgway, Pa., has been incorporated with a capital of \$35,000 to manufacture automobiles. William B. Arnold is the principal incorporator.

The board of education, Chester, Pa., will build a new four-story and basement school building to cost about \$300,000 to be used as a manual training department for the Chester High School. Contracts for construction have been awarded.

The Harrisburg Mfg. & Boiler Co., Nineteenth and Derry streets, Harrisburg, Pa., will enlarge its works and install new equipment to handle a Government contract for gun carriages, averaging from 30 to 35 lb. each. It is said that the contract totals about \$1,000,000. Samuel F. Dunkle is president.

Daniel J. Driscoll, operating iron and steel works at Auburn, Pa., has completed the construction of a new foundry at Hamburg to specialize in the production of steel billets. The plant will be operated in conjunction with the Auburn works.

The Individual Fire Escape Co., Atlantic City, N. J., has been incorporated with a capital of \$100,000 to manufacture automatic fire escapes. L. Leslie Headly, George Muller and Robert J. Elliott, all of Atlantic City, are the incorporators.

Baltimore

BALTIMORE, Dec. 3.

The American Propeller & Mfg. Co., 233-49 East Hamburg Street, Baltimore, will erect a one-story building, 156 x 200 ft., at a cost of about \$37,000.

The Bartlett-Hayward Co., Scott and McHenry streets, Baltimore, will build a one-story blacksmith shop at Ramsay and Parkin streets, 49 x 140 ft., at a cost of \$115,000. Morrow Brothers, Fidelity Building, have the contract.

The Bureau of Yards and Docks, Washington, D. C., has taken bids for the construction of a new four-story brick and concrete pattern shop at the Washington Navy Yard, 138 x 320 ft., to cost about \$440,000. It will also build a new ice manufacturing and cold storage plant at Hampton Roads, to cost \$300,000.

The Maryland Shipbuilding Co., Sparrows Point, Md., will build a one-story brick addition, 40 x 100 ft.

The J. Henry Smith Co., Baltimore, is making rapid progress in the erection of new shipbuilding works at Curtis Bay, which consist of a machine shop, mill buildings, joiner shops, blacksmith shop and mold works. Most of the equipment will be electrically operated. It is said that about 400 men will be employed.

A one-story power plant, 50 x 64 ft., will be constructed by the St. Marys Light & Power Co., St. Marys, W. Va. Ernest Mulloney is general manager.

A. Lee Knowles and J. H. Bryan, Staunton, Va., are organizing a company to establish a plant for the manufacture of automobile tires and other rubber goods.

The Marine Repair Corporation, Newport News, Va., recently incorporated, with a capital of \$50,000, will operate a marine repair plant. R. T. Pullen is president.

The Hampton Roads Shipbuilding & Dry Dock Co., Norfolk, Va., recently incorporated, with a capital of \$1,000,000, has acquired 150 acres for the construction of its proposed shipbuilding plant. It is said that the initial works will cost about \$800,000. R. B. Wallace is general manager.

Chicago

CHICAGO, Dec. 3.

Having closed against the large list of tools required for the manufacture of 75-mm. gun carriages, the Rock Island Arsenal is again in the market for at least \$1,500,000 worth of machines to be used in making 4-ft. 7-in. guns with recoil mechanism. About 150 lathes, as well as many other tools figure on this list. Large lathes are tighter than ever in the matter of deliveries, but small ones are easily obtainable, there not having been much demand for them. Boring mills are so scarce that some of the work ordinarily done on them is being done on big lathes, the work being clamped to the lathe face plate.

Dealers are becoming apprehensive over the extent to which deliveries of standard tools, already far behind, will be further delayed by the action of their principals in taking on the manufacture of special machines required for gun-boring, recoil parts, etc. Of course, it is to be understood that it is for the welfare of the Government and necessary to the prosecution of the war that these special machines be manufactured, and no shops are better qualified to make them than are those in which machine tools are built. The machine-tool builders had little choice in the matter. They must help the Government to the utmost and are pledged to do it. They are trying to prevent any interference with the production of their regular lines, also needed for war work but are facing a difficult task. The building of machines new to a factory is bound to upset the routine, and prevents the concentration of labor. The fact is that prior to the war there were few plants specializing in gun-making machines, and these machines are now wanted quickly and in large numbers.

The Stone & Webster Engineering Corporation, Boston and New York, which is building and equipping a repair depot in France, has placed a few additional orders in this market. The number of Eastern buyers who have found their natural market over-sold is steadily increasing in this territory, but they are not finding much solace here. It has been remarked that greater dependence than ever will have to be placed on second-hand machines, but the question is where good second-hand machines are to be found. The Monon Route is inquiring for three or four machines, including a planer and a couple of large lathes, and is asking for prices on second-hand tools, recognizing the impossibility of getting new machines. Industrial buying is light, but outfits of small tools are being sold here and there. The Goss Printing Press Co., Chicago, is working on gun mounts, and the Otis Elevator Co. is doing similar work at some of its plants.

New factory construction work is rapidly coming to low ebb, except where some war purpose is to be served.

McCord & Co., railroad supplies, 847 West 120th Street, Chicago (West Pullman) have been granted a permit for the construction of a one-story foundry, 72 x 214 ft., to cost about \$30,000, a transformer room to cost \$2,300, and a one-story blower house, 12 x 30 ft., to cost \$1,700.

Plans have been revised, and new bids are to be taken by W. T. Branitzky, architect, 64 West Randolph Street, Chicago, for a two-story factory, 120 x 200 ft., on Ravenswood Avenue near Montrose Avenue, for the H. G. Saal Co., maker of tools and hardware specialties. It will cost about \$160,000.

N. P. Severin, general contractor, 82 West Washington Street, Chicago, has started the construction of a one and two-story factory, 100 x 600 ft., for the International Airship Corporation, Gary, Ind. It will be of brick, concrete and steel and cost about \$200,000 with three hangars.

George P. Nichols & Bro., manufacturers of railroad machinery, 614 South Canal Street, Chicago, have purchased a plot, 124 x 300 ft., at Fulton and Leavitt streets, on which they will erect a one-story factory.

The machine shop of the Chicago, Wilmington & Southern Railroad at its coal mine at Thayer, Ill., was recently destroyed by fire, with an estimated loss of \$15,000.

The A. F. Meyer Mfg. Co., Morton, Ill., manufacturer of metal buckets, is contemplating an addition to its plant, 75 x 130 ft.

In a fire which did damage estimated at over \$100,000, the factory building at Monmouth, Ill., occupied by the Maple City Mfg. Co., the Boss Mfg. Co. and the Monmouth Acety-

lens and Electric Co. was destroyed. Much machinery, which will be difficult to replace at this time, was ruined.

The Combined Motors Corporation, Chicago, has been chartered under the laws of Illinois, to combine the business of the Bour-Davis Motor Car Co., Shadburne Bros., Chicago; the Dixie Motor Car Co., Louisville, Ky., and the Collins Body Co., St. Louis. Offices have been established in Chicago and St. Louis. The officers and directors are: B. L. Craig, president, Collins Body Co.; president; L. A. Shadburne, Shadburne Bros., vice-president; H. P. Brown, treasurer; William Ewald, assistant secretary; Alexander Hoyt, chairman executive committee; C. J. Bour, F. D. Hartman, W. L. Shadburne and Elmer F. Adams, directors. Large, well-equipped factories are now in operation at Frankfort, Ind., Louisville, Ky., and St. Louis, Mo. Another plant has been secured at Benton, Ill., and will soon be in operation. The company has in view a rubber company as part of its organization.

Milwaukee

MILWAUKEE, Dec. 3.

Despite a noticeable slackening in general local industrial activity outside of plants engaged on Government work, machine-tool manufacturers report many new orders. It would appear from the extent and urgency of the requirements of tool users that only a small part of their demands have been filled. The transition of the metal-working industry to a war basis is rapidly being completed, and even the smaller shops now are engaged on sub-contracts from Government contractors. In this manner the entire industry is being kept busy at maximum capacity.

The Racine Motor Truck Co., Racine, Wis., incorporated several months ago, with a capital stock of \$500,000, to develop the Piggins Bros. motor-truck manufacturing interests, will locate its headquarters at Appleton, Wis. A site has been purchased at Spencer and Story Streets, and preparations are being made for the erection of a one-story concrete, brick and steel machine shop, 60 x 300 ft. The product will be motor trucks in 1½, 2½, 4 and 6-ton capacities. Sixty-five men will be employed at the start. The officers are: President, Ira L. Miller; vice-president and works manager, Charles Piggins; secretary and treasurer, B. F. Henline. It is expected that the corporate style will be changed to the Reliance Motor Truck Co.

The Northern Casket Co., Fond du Lac, Wis., operating factories in Fond du Lac, Sioux City, Iowa, and Denver, Colo., has completed arrangements for the manufacture of a non-corrosive sheet-steel and statuary-bronze casket. Pending the erection of a metal-working shop addition to its Fond du Lac plant, production of the steel coffin will be carried on in temporary departments in its other factories. The company has purchased a site, 95 x 114 ft., adjacent to the Fond du Lac plant, and another, 120 x 150 ft., adjoining its Sioux City Works, for the erection of additional production facilities the coming year. William Mauthe is president and general manager; Elwood L. Russell, manager at Sioux City, and R. F. Bloedel, manager at Denver.

The Kiel Woodenware Co., Kiel, Wis., is taking bids for furnishing a 250-kw. motor-generator set and ten motors from 5 to 50 hp. capacity, for a power-plant addition and a new factory, 80 x 320 ft., under construction. Charles A. Cahill, 1426 First National Bank Building, Milwaukee, is consulting engineer.

The Milwaukee Ice Machine Co., Milwaukee, has an authorized capital stock of \$500,000, instead of \$50,000, as reported. It will lease or build a factory for the manufacture of ice and refrigerating machinery, and will specialize in a small unit for residences. The officers are: President, Harvey Marggraff; vice-president, Paul G. Dorow; secretary and treasurer, Fred Marggraff, 1008 First National Bank Building, Milwaukee.

The Janesville Electric Co., Janesville, Wis., is contemplating the installation of an additional 150-hp. water turbine unit in its hydroelectric plant on Rock River.

The Milwaukee Reliance Boiler Works, 1102 Thirty-second Street, Milwaukee, has broken ground for a forge and smithing-shop addition, 40 x 75 ft. John E. Sharp is president and general manager.

The Eagle Mfg. Co., Appleton, Wis., manufacturer of farm tractors and other farm machinery, has increased its capital stock from \$200,000 to \$500,000 and elected the following officers: President, Frank Saiberlich; vice-president, Oscar Saiberlich; secretary and treasurer, Edward Saiberlich; general manager, Charles H. Hagen; directors, A. W. Priest; August H. Meyer and Fred Peterson. Work on the new shop already is under way.

Charles H. Anderson, Marinette, Wis., manufacturer of brick and tile-making machinery and conveying equipment, has moved his foundry and machine shop to the former plant of the Engineering Works of Marinette, on Cook Street.

This permits of an increase of 25 to 30 per cent in the capacity.

The Laursen Automatic Pump Co., Menominee, Wis., at a special meeting of stockholders adopted a resolution assigning its assets to J. R. Meyers, Chicago, for the amount of the liabilities. The company will be reorganized under the direction of Mr. Meyers, and the present stockholders will be given an opportunity to participate in the new corporation. L. A. Laursen, founder of the company, retired several months ago, and now is manager of the United States Gear Shift Co., Eau Claire, Wis.

The Northwestern Ordnance Co., Madison, Wis., expects to occupy its new plant, 300 x 325 ft., about Dec. 15, and begin the manufacture of 4.7-in. guns for the Government. About 300 men will be employed in day and night schedules. Forgings and castings will be furnished by the Government. The company is financed by the Gisholt Machine Co., Madison, which is providing part of the lathe equipment.

The Summers Mfg. Co., Detroit, Mich., manufacturing machinery and equipment for milk condenseries, is reported to have decided upon the removal of its business from Detroit to Milwaukee on March 1, and will operate a plant at Thirtieth and Galena streets, and employ from 100 to 125 men.

The Stegeman Motor Car Co., 606 Linus Street, Milwaukee, which has been in process of reorganization for several weeks, will be succeeded by the Hercules Motor Truck Co., with a capital stock of \$100,000. No details of future plans are available. Arthur Davidson of the Harley-Davidson Motor Co., Milwaukee, is a stockholder. Lynn S. Pease, 1201 Majestic Building, is attorney.

The Ajax Forge Co., Chicago, announces that its new plant at Superior, Wis., will be confined to the manufacture of frogs, switches and railroad track material only and no forgings of any kind will be produced.

Detroit

DETROIT, Dec. 3.

The bettering of general manufacturing conditions has stimulated the machinery market, which has been unusually active the past week. Jobbers are complaining of deliveries, many of which are set from six to eight months ahead.

The Ecorse Foundry & Machine Co., Detroit, is making additions to its plant representing an outlay of \$100,000. Approximately seven acres of land have been purchased. Two buildings are being completed, with two more planned for early construction.

The Ford Motor Co., Detroit, has received an order for 5000 Liberty motors from the Aircraft Production Board. It is now largely engaged in the manufacture of airplane cylinders and is about to begin the production of ship fittings.

The Triangle Motor Truck Co., Clinton, Mich., has begun work on its new plant, and expects to be making trucks early in 1918.

The M. & S. Electric Co., capitalized at \$50,000, and the Auto Supply & Service Station, capitalized at \$10,000, have been incorporated at Flint, Mich., by Paul Schagane, Lillian Carey and DeHull N. Travis.

The Ex-Cell-All Products Co., Alma, Mich., will immediately start the construction of one unit of its plant and in the spring will add other buildings. It specializes in hardware supplies.

The Big Rapids Tractor Co. will build an addition to its plant in the spring.

The Union Cap Screw Co., Detroit, has increased its capital stock from \$5,000 to \$25,000.

The Baker Tractor Corporation, Detroit, has been incorporated in Delaware, with a capital of \$1,250,000., to manufacture tractors, plows, etc. Benjamin F. Mortenson, Frank E. and George J. Baker, Detroit, are the incorporators.

It is reported that the Jeffrey-Dewitt Co., Detroit, maker of spark plugs and other automobile specialties, will establish a branch plant at Huntington, W. Va.

Cleveland

CLEVELAND, Dec. 4.

The volume of machine-tool business being placed for Government work shows no falling off. The American Shipbuilding Co., which has recently taken an order for 36 boats for the Emergency Fleet Corporation, was a heavy buyer of machinery the past week for a machine-shop extension to its Cleveland plant. The F. B. Stearns Co. purchased considerable equipment for making airplane motors. Dodge Bros., Detroit, placed orders with a Cleveland machinery house for drilling and milling machines aggregating

about \$50,000. Other round-lot orders for machinery for Government work placed with Cleveland dealers include one from Dayton for \$30,000 worth of machinery, and another from a Cleveland company aggregating \$24,000. New inquiry for lots up to five or six machines is very plentiful, but no large list developed in the week. Machine-tool manufacturers are becoming so crowded with Government work that deliveries are being set further ahead. One manufacturer cannot promise shipments on large planers within 12 months unless the buyer has a priority order. Some of the machine-tool manufacturers have found it necessary to discontinue the making of some sizes of machines in order to devote their entire attention to making other types, usually of the larger sizes, to supply Government demands. Several makers have made slight price advances on smaller types of machines, including small lathes and bench milling machines. Some Eastern dealers are looking over this territory in search of good second-hand machinery, but are not finding much available, local demand being more than sufficient to absorb the entire supply.

The Chisholm & Moore Mfg. Co., Cleveland, is adding about 25 per cent to the capacity of its machine shop by the erection of an extension 39 x 130 ft. Some additional machinery will be required.

The Vlcek Tool Co., Cleveland, maker of mechanics' tools and automobile kits, has been reorganized, and its capital stock has been increased from \$300,000 to \$900,000. F. J. Vlcek remains as president and W. J. Hunkin of the Hunkin-Conkey Construction Co., Cleveland, has been made vice-president, and F. S. Macourek, long connected with the Peerless Motor Car Co., has been made secretary. The company contemplates enlarging its plant and eventually to manufacture all the tools contained in an automobile kit.

The Portage Rubber Co., Barberton, Ohio, has increased its capital stock from \$3,000,000 to \$10,000,000, and contemplates making some extensions to its plant.

The Johant Foundry & Heating Co., Akron, Ohio, has been organized, with a capital stock of \$100,000, by H. F. McGill, P. B. Treash and others.

The Wilson Rubber Co., Canton, Ohio, has commenced the erection of an addition, 44 x 120 ft., three stories.

The Marion Die, Tool & Machine Co., Marion, Ohio, has purchased the W. T. Johns Building in that city. It is a four-story structure 50 x 150 ft. The company has also purchased an adjoining site for other factory buildings as needed. E. W. Owen is president and general manager.

The Youngstown Auto Top Co., Youngstown, Ohio, has been incorporated, with a capital stock of \$10,000, by Charles L. McCoy, Edwin J. McCoy, and others. It will manufacture bodies for motor trucks, automobile tops, and similar products.

Cincinnati

CINCINNATI, Dec. 3.

New lists issued for machine tools, that would in normal times cause a great deal of comment, are now almost looked on with indifference. Usually a manufacturer picks out the machines on which he can make delivery within a reasonable time, but no orders can be accepted now with the promise of shipment within the time desired by the purchaser. Practically all business is confined to Government work either directly or indirectly. Second-hand tools, especially the larger sizes, are almost as hard to obtain for prompt shipment as are new machines. Boring mills seem to be scarcer than any other kind of machine tools, although the larger sizes of lathes are also hard to obtain.

Machine-tool builders have only been delayed to a very small extent on account of slow deliveries of castings from the foundries. Locally not much apprehension is felt as to any serious delays on this score, but shipments of other supplies cause some inconvenience. High-speed steel cannot be included in this, as shipments are coming forward promptly.

The forging plant of the Pollak Steel Co. at Carthage, a Cincinnati suburb, will be enlarged at an early date. No details as to the sizes of the buildings to be constructed are yet available.

The car repair shops of the Baltimore & Ohio Southwest Railroad Co., Sixth and Evans streets, Cincinnati, were badly damaged by fire Nov. 27. Inquiries will be sent out in a few days for machinery to replace damaged equipment.

McWilliams & Schulte, Cincinnati, box manufacturers, have acquired the plant of the Union Distilling Co. on Gest Street, and also an adjoining site, on which it is rumored a wood-working plant will be erected.

The L. Eld Concrete Construction Co., Cincinnati, has been awarded contract for building a garage and repair shop at Ninth and Sycamore streets, for the Schiear Motor Car Co., Cincinnati.

The American Blower Co., Detroit, is inquiring in this market for a new 26-in. upright back-geared drilling machine with power feed.

The Thomas Mfg. Co., Dayton, Ohio, has increased its capital stock from \$25,000 to \$300,000, and will install machinery for manufacturing small electric motors for phonographs, and other specialties.

The Thomas & Armstrong Co., manufacturer of sheet-metal specialties, London, Ohio, will erect two reinforced concrete buildings, 80 x 200 ft.

The Van Wert Foundry Co., Van Wert, Ohio, is completing an addition, 64 x 116 ft., of brick and steel. J. W. Longwell is president. It has increased its capital stock from \$15,000 to \$50,000.

The Leidecker Tool Co., Marietta, Ohio, will build a new plant in Westview, a suburb. Building details are not yet available.

The Niles Tool Works, Hamilton, Ohio, is having plans prepared for an addition. Harris & Richards, Fifth and Chestnut streets, Philadelphia, are the architects.

The Recording & Computing Machines Co., Dayton, Ohio, has purchased the building of the Dayton Body Co., which it will equip to manufacture optical instruments for the Government.

The Vaille-Rentchler Co., Hamilton, Ohio, recently increased its capital stock to \$100,000. The company was formed over a year ago to manufacture farm tractors and is adding equipment to its plant.

Indianapolis

INDIANAPOLIS, Dec. 3.

The Logansport Machine Co., Logansport, Ind., has increased its capital stock from \$50,000 to \$150,000.

The Universal Portland Cement Co., Gary, Ind., has increased its capital stock from \$1,000,000 to \$3,500,000.

The Frankfort Carburetor Co., Frankfort, Ind., has been incorporated, with \$250,000 capital stock to manufacture carburetors. The directors are Milton T. McCarty, Richard S. Voorhees, Carl W. Sims, William H. Spencer, and Eugene O. Burget.

The Edison Electric Construction Co., Gary, Ind., has been incorporated, with \$10,000 capital stock, to manufacture electrical equipment. The directors are Steven Blaner, Clarence Rockney and Charles Martin.

The Hidika Fluid Gauge Co. has been incorporated at Fort Wayne, Ind., with \$25,000 capital stock. The directors are Thomas F. Hilkert, E. B. Dill and P. T. Kavanagh.

G. A. Bartholomew, Kendallville, Ind., will establish a plant for the manufacture of automobile heating devices.

The Ross Gear & Tool Co., Lafayette, Ind., is building an addition to its plant that will greatly increase its capacity.

Remy Bros., Kokomo, Ind., are adding equipment for the manufacture of farm tractors.

The Central South

LOUISVILLE, Ky., Dec. 3.

More inquiries and a much larger volume of business are reported by local machine shops. Sub-contracts on war orders have been placed in considerable numbers. Implement manufacturers are handicapped by shortage of skilled labor and will not be able to make deliveries in full. Elevator manufacturing establishments are booking numerous orders. Agents of Eastern companies have been in this territory seeking labor.

New machinery is being installed by the Illinois Central Railroad in its shops at Paducah, Ky. Included is a drill press, two lathes and a pipe machine, all motor-driven. J. F. Walker, master mechanic, stated that the Government has taken over some equipment ordered for the shops.

The American-Metallic Packing Co., Lexington, Ky., is asking for prices on a second-hand 100 to 150 kw. 250 or 500-volt generator in first-class condition.

The Kentucky Solvay Coke Co., Ashland, Ky., has authorized an increase in its capital stock from \$270,000 to \$520,000.

The Cochran Bros. Corporation, Maysville, Ky., has been incorporated, with capital of \$100,000 by R. A., J. H. and A. M. J. Cochran to operate an electric power plant, now nearing completion.

The Ayrshire Coal Co., Oakland City, Ind., is in the market for a four-valve capacity, 250 volt engine generator set of 150 to 200 kw.

The Southern Engine & Boiler Mfg. Co., Jackson, Tenn., will increase its capital stock from \$50,000 to \$800,000.

The John G. Duncan Co., Knoxville, Tenn., is asking dealers' prices on a double-cylinder, double-drum hoisting engine and boiler, $8\frac{1}{2} \times 10$ -in. cylinders, approximately 30-hp. Also for a similar engine, $5\frac{1}{2} \times 7$, or $6\frac{1}{2} \times 8$ in.

The Dixie Planing Mill Co., Dickson, Tenn., will rebuild its plant, recently burned with a loss of \$150,000.

The French Coal Co., Hartland, W. Va., is in the market for electric hauling locomotives. M. McD. Price is manager.

R. P. Johnson, Wytheville, Va., is equipping a sawmill and is asking for dealers' prices on a second-hand outfit in first-class condition, to include 300-hp. in boilers; a 6-ft. band sawmill, two small locomotives, log trucks, planer, flooring machine, molder, resaw, ripsaw, swing cut off, lumber trucks, 125-hp. engine and an engine for driving planing-mill machinery.

The Bristol Door & Lumber Co., Bristol, Tenn., is planning to establish a plant to manufacture aeroplane parts, propellers, gunstocks, etc.

The Tubular Bucket Mfg. Co., Attalla, Ala., recently organized, is contemplating the erection of a plant for the manufacture of tin packing cans. The first unit will be one-story, about 60×220 ft., and will be equipped to provide for a production of about 75,000 cans daily. Bids for machinery will be asked during December. Webster B. Heidt is president.

The Keystone Graphite Co., Ashland, Ala., recently incorporated with a capital of \$150,000, is contemplating the construction of a new plant to cost about \$60,000. A. A. Allen is vice-president.

St. Louis

ST. LOUIS, Dec. 3.

The Domestic Electric Lighting Co., Gillette Building, Tulsa, Okla., is reported in the market for about \$5,000 of machinery.

John A. McNeely, Abbott, Ark., will install equipment for a general blacksmith, machine shop and wood-working plant.

W. W. Wood will rebuild his blacksmith and machine shop at El Dorado, Ark., requiring about \$4,000 of machinery.

The Brooks Burner Stove Co., Ardmore, Okla., incorporated with a capital stock of \$30,000, by Wilson Newman, W. L. Brooks, and others, will equip a foundry and machine shop.

The Dixie Engineering Co., Enid, Okla., P. H. Shaklee, president, is preparing specifications for a plant for the manufacture of feed mills and other machinery.

The Neupro Refining Co., Henryetta, Okla., will equip an oil refinery to cost about \$80,000 exclusive of the building.

The Wizard Producing & Refining Co., Oklahoma City, Okla., has been incorporated, with a capital stock of \$250,000, by D. K. Pope, R. L. Morehouse and others.

Leonard & Baynes, Metropolis, Ill., will install about \$15,000 worth of sawmill and wood-working machinery at Mariana, Ark.

The Omaha Lead & Zinc Co., Okmulgee, Okla., has been incorporated, with a capital stock of \$350,000, by E. J. Dick and J. S. Moore of Okmulgee and E. M. Cowherd of Boynston, and is in the market for mining and power-plant equipment.

The Missouri Pacific Railroad Co., E. A. Hadley, St. Louis, Mo., chief engineer, will install additional machinery in its shops and roundhouses at Hoxie, Ark., and Texarkana, Ark.

The Unit Portable House Co., Gulfport, Miss., O. W. Rosen, president, will equip a plant for the manufacture of portable houses for shipment to France.

The Mississippi Veneer Co., Sandersville, Miss., G. W. Headley, Jr., president, capital \$50,000, will equip a mill of 25,000 ft. daily capacity. Bids for the machinery are being taken.

The Machinery Exchange Co., New Orleans, La., is in the market for 2000-hp. boilers, 1500-hp. condensing engine, and other machinery.

The Liberty Systems Corporation, Edwardsville, Ill., has been incorporated in Delaware, with a capital of \$1,000,000, to manufacture accounting machines. S. F. Lloyd, L. A. Watters and E. L. Reel, Edwardsville, are the incorporators.

The St. Louis Aircraft Corporation, St. Louis, has been incorporated in Delaware, with a capital of \$400,000, to manufacture airplanes. M. M. Clancy, Wilmington, Del., and Clement M. Egner, Elkton, Md., are the incorporators.

Texas

AUSTIN, Dec. 1.

The Southwestern Graphite Co. will install additional machinery and enlarge its refining plant near Burnet.

A. O. Thompson will install an irrigation pumping plant near Hereford.

The Galveston, Harrisburg & Santa Fe Railroad will develop water supplies and install pumping plants at Loco Marathon and Marfa.

W. L. Spence, El Paso, will build a saw mill near Alamogordo, N. M., which will have a daily capacity of 15,000 ft.

The Grayburg Hardwood Co., Grayburg, recently incorporated with a capital stock of \$40,000, will build a lumber mill. W. F. Wallace is a stockholder.

The plant of the Tofte Boiler & Sheet Iron Works, Beaumont, which was recently destroyed by fire with a loss of \$80,000, will be rebuilt. More than \$60,000 worth of new machinery will be installed.

California

LOS ANGELES, Nov. 27.

The San Pedro, Los Angeles & Salt Lake Railroad Co. Pacific Electric Building, Los Angeles, is having plans prepared for the construction of a one-story building, 65×80 ft., and two wings, each 65×220 ft., to its local repair shops.

The Los Angeles Shipbuilding & Drydock Co., Los Angeles, will build a one-story addition, 100×300 ft., to its works at San Pedro.

The Bennett-Montgomery Hardware Co., Los Angeles, has been incorporated, with a capital of \$50,000, to manufacture hardware. Val F. Montgomery and L. A. Childs, Los Angeles, and B. B. Bennett, Pasadena, are the incorporators.

The American Aircraft Co., Los Angeles, recently incorporated, has increased its capital from \$10,000 to \$50,000.

The Central Machinery Mfg. Co., Los Angeles, will build a one-story machine shop, 41×122 ft., at 1629 San Pedro Street, near Sixteenth Street, to cost about \$5,000.

The Cousins Tractor Co., Hanford, Cal., has been incorporated, with a capital of \$100,000, to manufacture tractors. It will build a shop on East Seventh Street to specialize in repair work. H. R. Cousins and A. D. Ferguson are the incorporators.

The San Joaquin Light & Power Co., Fresno, Cal., is planning for the construction of a new hydroelectric power plant on the upper Kings River, near Hanford, to cost about \$1,500,000. A. G. Wishon is general manager.

George Storey, El Centro, Cal., has acquired property at First and Main streets, Yuma, Ariz., and will establish works to specialize in automobile repairs. M. H. Powell is also interested in the enterprise.

The Pacific Northwest

PORLAND, ORE., Nov. 26.

With the settlement of the more important industrial strikes, an increased demand for marine engines and other machinery is noted. Notwithstanding the season, the logging and lumber industries are growing steadily. The placing of additional orders for steel vessels by the Shipping Board has led to the expansion of several shipyards, and the difficulties in getting machinery and parts from the East has caused an increase in manufacturing, particularly in the making of parts. The scarcity of cars is becoming more pronounced.

The Columbia River Shipbuilding Corporation, Portland, has petitioned the City Council for the vacating of Wood Street, preliminary to building an addition to its plant.

The Pocatello Engineering & Machinery Co., Pocatello, Idaho, has increased its capital stock to \$100,000.

The White Pine Lumber Co., Bend, Ore., has completed plans for the erection of a lumber mill at Pringle Falls, with a daily capacity of 80,000 ft., at a cost of \$140,000. A hydroelectric power plant of 2250 hp. will also be built.

The Sumner K. Prescott Co., Seattle, has succeeded to the business of the Hendricks Mfg. Co., and will install a department for the manufacture of trucks and attachments.

The Olympic-Portland Cement Co., Bellingham, Wash., contemplates converting its oil-burning plant to a coal burner, and will install coal-pulverizing machinery.

The Seattle Veneer & Box Co., Seattle, is completing plans

for its proposed new plant on the Duwamish Waterway, the main building to be 80 x 200 ft.

The Martinoloch Shipbuilding Co., 308 California Building, Tacoma, which is building a plant at Quartermaster Harbor, reports that it has contracts for three auxiliary wooden vessels, each to be 250 ft. long.

The H. N. Rothweiler Co., Seattle, is establishing a factory, at an expenditure of \$20,000, for the manufacture of the Rothweiler barrel pump and to turn out machined screw parts for machine and shipbuilding work.

It is reported that the shops of the Chicago, Milwaukee & St. Paul Railway Co., Tacoma, Wash., are to be enlarged. Electrification of the Milwaukee lines to Puget Sound will soon be completed.

The Astoria Marine Iron Works, Astoria, Ore., has started work on the first unit of its proposed new plant. The main machine shop will be 90 x 110 ft., and the foundry 60 x 110 ft., each two stories. It recently placed an order with an Eastern company for 300,000 lb. of forgings, which will be machined at the Astoria plant.

J. C. Corbin, Arcade Building, Seattle, consulting engineer, has been retained by a Canadian firm to design changes in their refrigerating plant in Victoria, at a cost of \$25,000. It will be converted to electric drive and the capacity increased. Special motors and machinery will be installed.

Canada

TORONTO, Dec. 1.

The plant of the Alabastine Co., William Street, Paris, Ont., was destroyed by fire on Nov. 25 with a loss of \$35,000.

The blacksmith and fitters plants owned by the Grand Trunk Railway at Brockville, Ont., which were destroyed by fire Nov. 25 with an estimated loss of \$50,000, will be rebuilt. Machinery will be required to replace that destroyed by fire.

The Saskatchewan Co-operative Elevator Co., Port Arthur, Ont., will build an elevator at a cost of \$450,000. The unloading capacity will be 12 cars per hr. and shipping capacity to the boats 45,000 bu. per hr.

The Canadian Northern Elevator "B" at Port Arthur, Ont., will be rebuilt at a cost of \$500,000.

The T. H. Taylor Co., Ltd., Chatham, Ont., is in the market for a complete outfit of Jones underfeed stokers for two boiler installations, including engine, fan, etc.

The Canada Machinery Corporation, Galt, Ont., will dismantle and re-erect in Galt a brick and steel building owned and used by it in Hamilton, Ont.

The Ker-Carb, Ltd., Toronto, has been incorporated with a capital stock of \$20,000 by James H. Spence, 46 King Street West, and others, to manufacture electrical apparatus, etc.

The Renfrew Refrigerator Co., Ltd., Renfrew, Ont., has been incorporated with a capital stock of \$100,000 by Robert Handley, Alexander Blue, and others, to manufacture refrigerator machinery, etc.

The Auto-Printing Register Co. of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$50,000 by John Schiappacasse, Detroit, Mich.; Alexander M. Snyder, Toronto; Henry D. Petrie, Hamilton, and others, to manufacture printing, vending and recording registers.

The Grand Trunk Railway, Montreal, will erect a machine shop at Lindsay, Ont., to cost about \$40,000.

The Dominion Bridge Co., Montreal, proposes to install a plant at Lachine, Que., for the manufacture of marine forgings, etc.

The St. Clair Foundry Company's plant on the Esplanade, Toronto, was damaged by fire with a loss of about \$10,000.

The McLean Brothers' shipyard at Mahone Bay, N. S., has been leased to Montague Mahaffy and is being extended so that three ships can be built. A new mill is being erected and heavier machinery and air compressors for driving pneumatic tools will be added.

The ratepayers of Whitby, Ont., have carried a by-law to loan \$25,000 to the United Rubber Mfg. & Reclaiming Co. of Toronto. The company will commence at once the erection of a factory, 60 x 160 ft., to cost \$15,000. It is reported that \$25,000 worth of machinery will be installed.

The plant owned by the Cranbrook Sash & Door Co., Cranbrook, B. C., destroyed by fire with a loss of \$40,000, will be rebuilt. New machinery will be purchased.

The Imperial Munitions Board, Ottawa, has received instructions from the British Government to issue contracts for shrapnel, 4.5-in., and 6-in. shells to Canadian firms properly equipped.

The International Engineering Co., Amherst, N. S., will build an addition to its molding shop to cost \$4,000.

The Canadian Swift Packing Co. will build a plant at Maillardville, B. C., to cost \$750,000.

The Dominion Cement Co., Ltd., 92 Notre Dame East, Montreal, will build a plant to cost \$100,000. J. A. Vinet, 92 Notre Dame East, is secretary and treasurer.

The Polson Iron Works, Frederick Street, Toronto, will build a galvanized-iron pattern mill and joiner shop to cost \$10,000.

The Adams Brothers Harness Mfg. Co., 204 King Street East, Toronto, will build an addition to its factory to cost \$60,000.

Sproatt & Rolph, 36 North Street, Toronto, have prepared plans for a foundry for W. H. Banfield & Sons, 272 Page Avenue, Toronto, to cost \$4,000.

The Canadian Copper Co., Copper Cliff, Ont., is having plans prepared for a one-story brick machine shop at Creighton Mines, Ont., to cost \$10,000. J. G. Agnew is manager.

The foundry owned by Charles Lake, 46 West Street, Brantford, Ont., was destroyed by fire Nov. 30 with a loss of \$50,000.

NEW TRADE PUBLICATIONS

Steel Sash.—David Lupton's Sons Co., Weikel and Westmoreland streets, Philadelphia. Pamphlet entitled, "Air, Light and Efficiency." Pertains to the part played by building design and the installation of various types of sash in securing the maximum output from a plant. After a brief general discussion of this subject, numerous installations are illustrated and described. A description of the several types of the sash and the devices employed for their operation is included.

Pressure and Draft Recorders.—Bacharach Industrial Instrument Co., 422 First Avenue, Pittsburgh. Catalog D. Explains the design and construction of the Hydro pressure and draft recorders with illustrations of the different types. Mention is made of the application of the recorder in different fields of industry and specimen records are included.

Ball Bearings.—S. K. F. Ball Bearing Co., Hartford, Conn. Pamphlet. Refers to the use of ball bearings in woodworking machinery. A concise statement of the reasons leading to the use of these bearings chief of which was the ability to get higher speeds is given, followed by a brief description of the bearing and its application to different types of woodworking machinery. Only the machines in general use such as band and circular sawing, planing, surfacing, jointing, shaping and grinding machines and lathes are covered. In each case a short statement of the advantages of the bearings for that particular machine is given, the text being supplemented by numerous halftone engravings of the machines themselves and line drawings showing the way in which the bearings have been installed.

Metal Cutting Saws.—Simonds Mfg. Co., Fitchburg, Mass. Booklet entitled "Saws Sammy Showme Saw." Is a series of 12 advertisements showing the various uses to which metal cutting saws of different styles can be put. These include the production of shells, the cutting of forgings, bar stock, rails, etc., slotting screws and cutting-off structural shapes. Illustrations of the blades in use are presented in every case with brief descriptions of the work that is being done and the time required to do it.

Thread Milling Fixture.—Hall Gas Engine Co., Inc., Bridesburg, Philadelphia. Pamphlet. Calls attention to a fixture for producing threads by the milling process on automobile, gas engine, aircraft, talking machine and small ammunition parts, thin tubing, etc. The work which the fixture will do and the way in which it does it is described in considerable detail, the text being supplemented by numerous illustrations.

Wood Boring Machines.—Oliver Machinery Co., Grand Rapids, Mich. Circular. Describes a universal vertical and horizontal wood boring machine which can also be employed for drilling holes in metal and for doing the work of routing, shaping, buzz planing or sanding machines. The construction is gone into at some length and the text is supplemented by a number of views of the different driving arrangements that can be employed. Mention is made of a line of cutters for use on a boring or profiling machine for working out small core boxes, making fillets and routing. A number of views of the work that has been done by the cutters are included.

